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Please notice that the date of the revision is November 2005, but the distribution of the revision was completed January 2006.

The Plans Preparation Manuals has been revised as of November 2005. To download the November 2005 Plans Preparation Manual and its changes, please go to:

<http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/Plnsprep.pdf>

Instructions:

Page numbers and corresponding sheet-counts are given in the table below to indicate portions of the *Plans Preparation Manual* that are to be removed and inserted to accomplish this revision.

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Foreward

This manual is intended to provide instruction and guidance for the preparation of right of way plans, contract plans, special provisions, and estimate package for a highway construction project. The manual also provides the standards used in the preparation of these plans using Computer Aided Drafting and Design (CADD).

Updating this manual is a continuing process and revisions will be issued as required.

Questions or suggestions for modifications should be addressed to the Headquarters Project Development Branch. Address orders for manuals to Publications Support Services, Transportation Building, Olympia, Washington 98504-7400, or telephone (360) 705-7430.

HAROLD PETERFESO
State Design Engineer

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the original transaction has been recently completed. A new parcel number will be needed for these parcels.

4. Subdivision plats and/or other pertinent data.
5. Coincidental with (1) above, when original right of way negotiations are incomplete or revision affects condemnation proceedings, the regional Manager of Real Estate Services is advised to take appropriate action pending final approval of the revision.

180.03 Olympia Service Center Processing

1. The R/W Plans Section will make a final review of the plan revisions, coordinate the review with other branches and FHWA, as required.
2. Subsequent to review, the original plans are revised and the R/W Plans Engineer in OSC approves the revisions.
3. Following the plan revision approval, distribution is made as follows:
 - a. Mylar reproducible of the revisions to the region.
 - b. White print of the revisions to the OSC Real Estate Services Office.
 - c. Half size copy of limited access plan revisions to all Olympia Service Center limited access book holders.

190 Access Control Notes

190.01 Instructions

Standard access control notes cover all necessary descriptions to be shown on the plans for the granting of approaches. An access approach note plus necessary supplementary notes will be used to identify all like approaches listed.

The access approach schedule on the Right of Way Plan shall list the specific details for each approach. Under Station on Roadway, enter the exact station or the stations between which limits the approach will be granted, the side of center line (right, left, or both), and any supplementary information required, shall be listed. Under Type, indicate the letter and/or applicable supplementary note numbers.

The supplementary notes are used in conjunction with the access approach notes to which they apply. Each supplementary note shall always be listed by the number assigned to it. In this manner, an access approach note letter with a supplementary note number will always indicate the same type of approach throughout all Right of Way Plans.

Type A through Type E approach notes are defined in WAC 468-58-080 and are shown in the *Design Manual*, and are listed below in 1-9 B. Access Approach Notes.

Note No. 8 will be used to prohibit traffic movement between the railway right of way and the traveled highway lanes.

Note No. 21, Utility Within Right of Way Maintained from Outside Right of Way, refers to a utility within the right of way by franchise or permit where all access is to be from the adjacent streets, roads, or property. The supplementary note number only will be listed under the Type column of the access approach schedule.

If it is necessary to add a special stipulation to an approach note, an asterisk may be indicated after the letter and/or number in the Type column of the access approach schedule. The special stipulation indicated by the asterisk shall be explained under the Access Notes column in the same manner as a footnote.

190.02 Access Approach Notes

1. Type A Approach Note.
Type A approach is an off and on approach in legal manner, not to exceed 30 feet in width, for sole purpose of serving a single

family residence. It may be reserved by abutting owner for specified use at a point satisfactory to the state at or between designated highway stations.

(This note may be supplemented by a note stating the number of users and/or special use.)

2. Type B Approach Note.
Type B approach is an off and on approach in legal manner, not to exceed 50 feet in width, for use necessary to the normal operation of a farm, but not for retail marketing. It may be reserved by abutting owner for specified use at a point satisfactory to the state at or between designated highway stations.

(This note may be supplemented by a note stating the number of users and/or special use.)

3. Type C Approach Note.
Type C approach is an off and on approach in legal manner, for special purpose and width to be agreed upon. It may be specified at a point satisfactory to the state at or between designated highway stations.

(Always supplement by notes stating number of users, special use, and width.)

4. Type D Approach Note.
Type D approach is an off and on approach in a legal manner not to exceed 50 feet in width for use necessary to the normal operations of a commercial establishment. It may be specified at a point satisfactory to the state at or between designated highway stations.

5. Type E Approach Note.
Type E approach is a separated off and on approach in a legal manner, with each opening not exceeding 30 feet in width, for use necessary to the normal operation of a commercial establishment. It may be specified at a point satisfactory to the state at or between designated highway stations.

190.03 Supplementary Notes

1. Offset Access Note.
No. 1. This approach is to be used to travel on right of way and enter property as specified.

(In the access approach schedule, list the station of approach on roadway and the station where property is to be entered; e.g., 146+00 Rt. to leave R/W 148+50 Rt.)

2. Joint Usage Note.
No. 2. This approach is to be used to serve more than one owner and/or utility, for only those ownerships listed on the access approach schedule.

(Use this note for each approach serving more than one owner and/or utility.)

3. Modified Access Control Note.
No. 3. No longer used.

4. Special Farm Equipment Note.
No. 4. This approach may be increased in width not to exceed 80 feet for use by special farm equipment. During the crossing of the highway with farm equipment requiring an approach exceeding 50 feet in width, traffic on the highway shall be protected by flagmen provided by the owner at his expense.

5. Utilities Note.
No. 5. This approach is to be used for the operation, maintenance, and repair of the utility specified. The approach shall not exceed 50 feet in width.

(In the access approach schedule, state the station limits on the roadway, the type of utility and, if required, the gating restriction.)

6. Grain Hauling Note.

410 Introduction**410.01 Description**

The plans, specifications, and estimate (PS&E) are some of the documents required for the advertisement of a project.

The plans and contract provisions must set forth the work in a clear and concise manner to avoid misinterpretation.

The plans shall conform to the geometric design features specified in the design portion of the project file, see Section 330.06(2) of the Design Manual. All plan details and contract provisions are to be specifically applicable to the project being developed. It is acceptable to use details and provisions from previous contracts. They should, however, be examined closely, and modified as required, to ensure that they are specifically applicable to the current project.

Deviations from Washington State Department of Transportation (WSDOT) policies and standard practices require approval by the appropriate approving authority, in accordance with the Design Manual, in advance of advertisement of the project.

The Region and the Headquarters Bridge and Structures Office will coordinate design schedules, when structures are involved to ensure that the project will be completed in a timely manner.

410.02 Plan Preparation

The contents of this manual can be applied to the majority of the projects the designer will encounter. It is understood that no two projects are the same, and that it is impossible to provide information for every circumstance that may be encountered. There will be those projects, or portions of projects, that do not fit the standard applications. In these cases, the designer must be able to recognize the need to adjust the

standards to best depict the work to be accomplished.

This manual is intended to show representative information and examples the designer can, and should, use as a basis to make decisions on what is required, what is to be included in the PS&E, and how it is to be shown in the plans. It should be understood that the main responsibility of the designer is to assemble a package that contains the precise information required by a contractor to submit a responsible bid and for WSDOT to get an acceptable finished product. Providing too much information can, at times, cause as many problems as not providing enough. The designer must remember that projects requiring contractor surveying will require more detail and information than a project being surveyed by WSDOT.

The designer is to take every opportunity to reduce the volume of the plans by using logical combinations of plan series to best display the information. Because there are no two projects exactly the same, the designer needs to examine the logical combinations of plan series for each project. Displaying too much information may cause confusion to the contractor bidding the project and could result in higher bid prices. Then again, a series of plan sheets with minimal information displayed on each sheet makes it difficult to determine the interrelationship of different items of work, which could also equate to increased prices by bidders estimating the project. A balance resulting in the complete and accurate information on the correct series of plan sheets is what is necessary.

The designer must remember that standards are not developed to stifle their ability to design, but instead to provide consistency across the state. We should be doing the same work the same way, regardless of where the project is located. Which means consistency of state standards should be followed whenever possible. When standard materials are called for, the contractors

and the suppliers know exactly what we're looking for and what to expect in the way of testing and approvals. When the same work is specified and represented in the plans the same way, the contractors know exactly what will be required and what will be acceptable. Using standard items and construction methods is almost always more economical. Proprietary items should be avoided if at all possible.

A tool available to the designer to ensure that required items are addressed during the PS&E preparation is the "PS&E Review Checklist", available on the WSDOT Internet/Intranet Home Page under the Project Development Branch. (<http://www.wsdot.wa.gov/eesc/design/projectdev/>) This checklist contains the type of information that will be examined during the Stewardship Process Review, conducted by Headquarters and FHWA at the end of the project.

420 The Project Manager's Responsibilities

All projects must have formal approval action in order to be advertised. See Figure 4-1 for "Approval for Ad Memorandum." See Advertisement and Award Manual for approval levels.

420.01 General

The project manager has the responsibility:

1. To prepare the PS&E in accordance with the approved design portion of the project file and in the format presented in this manual.
2. To obtain permits, approvals, clearances, and certifications for which the region is responsible. The PS&E shall reflect the requirements of these documents.
3. To provide and maintain accurate bid item quantities, reasonable unit prices, and backup data used to determine the estimated cost for lump sum bid items or other bid items that have little or no historical cost data.
4. To maintain the cost of the project within the budgeted amount. Request additional funds when through the course of a project it becomes apparent that adequate funds were not initially set up to either cover design or construction costs.
5. To assure that the aggregate total cost of state force work and state supplied materials are in accordance with RCW 47.28.030 and RCW 47.28.035. See [Section 750.25](#).
6. To determine the sources for materials and locations of sundry sites furnished by WSDOT. To verify the quality and quantity of material available at the provided sources.
7. To verify that required new right of way will be secured prior to need.
8. To coordinate the Headquarters Bridge and Structures Office PS&E preparation with the Region PS&E preparation. To provide the Headquarters Bridge and Structures Office with design and bridge site data in a timely manner.
9. To ensure that reviews by the Region and the appropriate Headquarters offices have been completed. That the design team has returned a brief written response to all review comments, and that all appropriate changes have been incorporated into the PS&E prior to advertisement.
10. To coordinate activities and review for projects on National Forest System land per memorandum of understanding NFS 00-MU-11060000-040 *Between* State of Washington Department of Transportation *And* USDA Forest Service Pacific Northwest Region.

11. To provide a memorandum with written justification, to the Assistant State Design Engineer (ASDE), for the use of all proprietary items. See [Section 750.16](#).
12. To provide a memorandum with written justification and estimated costs, to the Assistant State Design Engineer (ASDE), why it is in the public interest to use state furnished materials, state labor, a mandatory materials source, and/or a mandatory waste site. Federal Highway Administration (FHWA) approval is required on federal aid projects for Interstate New/Reconstruction. See [Sections 740.03 & 750.25](#).
13. To coordinate with regional offices (Utilities engineer, Right of Way office) to obtain written construction permits and easements for work to be performed outside of WSDOT right of way.
14. To coordinate with regional permitting offices (Utilities engineer, R/W engineer, Highways and Local Programs, Environmental, etc.) to obtain all required agreements to perform work under the contract for governmental agencies, private companies and private individuals. These agreements shall include how the work is to be funded. There shall be substantiation that the benefit derived from the work is equal to or greater than the cost to WSDOT. Also to ensure that all local, state and federal regulations have been addressed for the project.
15. To provide justification and obtain approval from Headquarters Transportation Data Office (TDO) for liquidated damages including interim liquidated damages other than those specified in the Standard Specifications. See [Section 750.11](#).
16. To provide justification and obtain approval from Headquarters Construction Administration for incentive/disincentive pay and liquidated damages that revises the Standard Specifications 1-08.9.
17. To provide justification for stockpiling materials for use on future construction contracts.
18. To provide justification for not using all pipe alternates.
19. To provide justification for the use of construction engineering percentages different from the percentages specified in Division 8.
20. To ensure that the project title matches the Capital Projects Reporting System title or obtain permission to change the title. When multiple State Routes are used in a title the smallest State Route number followed by et al. is used to shorten the title.
21. To provide justification and obtain approval from Headquarters Construction Administration for using nonstandard time for project completion specifications.
22. To provide justification and obtain approval from Headquarters Construction Administration or the delegated authority in each Region for all of Division 1 (with the exception of Section 1-04, 1-05 and 1-09 which Headquarters Construction has retained), for using project specific specifications that alters the Standard Specification for Road, Bridge, and Municipal Construction book and/or GSPs.

NOTE

Headquarters Construction desires to maintain consistency, accuracy, and legality with project specifications. That is why a project designer should always try to use specifications that are listed in the Standard Specifications for Road, Bridge and Municipal Construction Book – henceforth referred to as Standard Specification Book in these paragraphs. It is not uncommon for a project to have a method of work, or a working window of time that differs from those listed in the Standard Specification Book. There are also items of work that are Region specific and as such aren't covered in the Standard Specification Book. In those cases where there is a nonstandard item of work in a project, the designer may write a Project Specific Special Provision to describe the work. In the case of a Regional nonstandard item of work, the Region may write Region General Special Provisions (RGSPs) to describe the work. If these Project Specific Specifications or RGSPs change the content or wording of any specifications in Divisions 1 through 9 of the Standard Specifications Book, then approval must be given from Headquarters Construction or the delegated authority in each Region for all of Division 1 (with the exception of Section 1-04, 1-05 and 1-09 which Headquarters Construction has retained). In some cases Headquarters Materials must approve change to Division 9 before using Project Specific Specification or RGSP in a project.

Once a Region GSP has been approved by Headquarters Construction, it can then be used on future projects without being submitted to Headquarters Construction for approval again unless the Region GSP instructions

state that approval is required for each project. However, Project Specific Special Provisions, when approved by Headquarters Construction, are only to be used in the project they were written for. They cannot be used on another project without acquiring Headquarters Construction's approval again. When referencing the Standard Specifications in the special provisions the headings from the Standard Specifications are never to be changed. When a section of the Standard Specifications is "Vacant" the designer is **not** to use these sections for their special provisions.

23. To ensure that the contract plans and specifications are stamped in accordance with WSDOT Executive Order E 1012.00, Certification of Documents by Licensed Professionals.

It is essential that the Project Manager understands and ensures that no alterations to plans or specifications are made by anyone but the person who submitted the plans or specifications under their personal PE stamp and signature. This includes Headquarters Bridge and Structures, Traffic, Architecture, Landscape Architecture, Surveying or any other branch that certifies design with a professional stamp.

The professional licensee who was directly responsible for the original documents shall certify all revisions to plans and specifications.

Changes regarding quantities, payment estimates, and time lines are not considered technical changes. They therefore do not require certification by a PE. However, all changes in these areas shall be verified and documented by the original designer/submitter of that

item of work, and shall not be changed by the Project Manager without the specific permission of the original designer/submitter.

430 Headquarters Assistance/Review

430.01 General

Various offices of expertise are available for assistance if requested by the region. The following offices of Headquarters are available to assist during PS&E preparation:

Headquarters Real Estate Services Office
(MS 47338)

Headquarters Design Office
(MS47330)

Headquarters Hydraulics Branch
(MS47329)

Headquarters Project Development Branch
(MS47330)
Assistant State Design Engineers
Plans Liaison Engineers
EBASE /CREM Engineer
Wage Rates /GSP/Amendment Engineer

Headquarters Accommodation Branch
(MS47329)
Railroad Engineer
Utilities Engineer

Roadside Safety Engineer
(MS47329)

Roadside and Site Development
(MS47329)
Landscape Architect

Headquarters Bridges and Structures Office
(MS 47340)

The Transportation Supervising Architect
(MS47340)

Headquarters Traffic Operations Office
(MS47344)

Headquarters Materials Laboratory
(MS47365)

Headquarters Highway Maintenance Office
(MS47358)

Headquarters Construction Office
(MS47354)
Specifications GSP/Amendments Engineer

Headquarters Architectural Design and
Construction Manager
(MS47328)

Headquarters Office of Equal Opportunity
(OEO)
(MS47314)

The External Civil Rights Office will monitor the participation of the goals in projects. DBE goals (federally funded projects) are zero goals, the MWBE goals (state funded projects) are all voluntary goals and, if applicable, the number of training hours assigned for projects over \$500,000 and 40 or more working days.

Headquarters Systems Analysis and
Program Development
(MS47325)

Verification of program approval and funds available, fund authorization, and federal-aid project approval and authorization is obtained through this office. Federal Aid numbers are obtained from this office.

A transmittal letter stating the following is to accompany the review copies of the PS&E sent to the aforementioned office: See Appendix A3

1. Name and phone number of individual transmitting documents for review.
2. The date the review comments are due back to region.

3. The individual you want the review comments sent to (if not person listed in item no. 1 above).
4. The tentative project advertisement date.

440 Drafting Requirements

440.01 General

How the plan information is displayed on the plan sheets can have a great impact on the usefulness of the plans. To get the best possible bid and the best possible finished product, the plans must present the information clearly and concisely. Everyone who examines the plan should be able to easily determine what work is required and arrive at a single interpretation of the information.

To ensure a clear and singular interpretation, it is imperative that overcrowding of plan sheets is avoided by displaying only information relevant to the plan series, and that the plan be drawn with appropriate drafting standards as specified in this manual.

The designer will need to determine what information is required for the contractor to bid and construct the project, and for WSDOT to administer the project. Requirements of other readers such as FHWA and various Headquarter offices also need to be considered. Many of the requirements in this manual, such as begin and end Federal Aid number and section lines shown on the vicinity map, may not be required to construct or administer the project but have value to other users of the contract plans.

The designer also needs to determine what information does not add value and only serves to clutter up the plans and create confusion for the reader. Following are some examples of how to eliminate excess plan sheets or information that **should not be included in plan sheets**:

Right of Way lines that have no ties add no value. If Right of Way needs to be shown it should have ties showing where it is.

Future alignments that have nothing to do with construction of the project can often clutter up a plan sheet making it hard to find the needed information.

Showing existing pavement markings / edge of existing roadway on paving plans or pavement marking plans.

Showing anything that is slated for removal on a site prep plan anywhere else in the plans.

Repeating plan sheets just to keep the same number of sheets in each series. Use break lines to eliminate sheets of non-changing information. If there is no drainage code on a drainage plan sheet then the sheet shouldn't be included in the series. Also for paving plans and pavement marking plans, if nothing changes between intersections or interchanges, use break lines to eliminate sheets.

Detailing areas by shading or cross hatching without showing any dimensions.

Profiles sheets showing overlay, grinding and inlay, or paving exception areas of the project add no value. Show only the portions of the project that have a change in the vertical alignment of the roadway under construction. The same way showing information already shown on roadway sections on paving plans without showing dimensions adds no value to the contract.

In general, if it does not provide needed information or add value to the plans
...**DELETE IT!**

The designer, early in the design process, needs to give careful consideration to the different

series of plan sheets that will be required and the information that will need to be displayed on each series.

The use of different levels with the computer aided drafting and design (CADD) system allows the flexibility to provide additional series of plans quite easily and quickly if it turns out that there is more information required than originally anticipated. This is why it is important that all CADD work use the prescribed level scheme.

Most of the drawings created by CADD users in a design office are 11X17 plan sheets for PS&E. Therefore, references will pertain to that size unless otherwise noted. In general, the plotting scale for 11X17 plan sheets is 1 inch equals 100 feet (1"=100'), except as indicated below. This is done by setting the plotting scale in MicroStation under the WSDOT pull down menu.

Vicinity maps are to be drawn at a scale appropriate to the size of the project and the detail required to show the appropriate information, as discussed in [Section 460.03](#).

Sheets requiring a larger scale to display a great deal of information in a small area should be drawn to an appropriate scale to allow all information to be easily read and understood.

Strip maps are to be drawn at a scale appropriate to display the information clearly.

There may be occasions when the scale of a plan sheet needs to be increased to as much as 1" = 40' for 11"x17" plan sheet. When this is done, the designer needs to examine the sheet to be sure that required information is easily read. It may be necessary to resize some text or symbols to make them legible.

The designer shall avoid the practice of cross-hachuring, or polka-dotting, or shading of large areas to represent areas to be paved, planed or anything else. The roadway sections will adequately show the areas to be planed and paved. The use of large areas of cross-

hachuring only hides or distract from the rest of the information being displayed on the sheet.

Use cross-hachuring for small, isolated areas of work, such as pavement repair areas, or butt joint planing locations, that may get lost if not displayed in this manner. Gray area shading is reserved exclusively for use in an addendum to highlight changes to a plan sheet.

See [Appendix 5](#); Addendum Preparation

Plan sheets may be plotted on paper from CADD or printed on paper from microcomputer files. Plan sheets may also be hand drafted in black ink.

Sheets utilizing a combination of CADD generated base maps and inked construction features will be considered hand-drafted sheets. No stick-ons are to be used on plan sheets.

All screened (half toned) portions of plan sheets shall be dark enough to adequately reproduce.

Line weight, lettering height, and symbols for contract plans shall conform to the standards contained in Division 5. It is important to conform to these standards for consistency and for reproduction reasons.

Under most circumstances, lettering and dimensioning shall be placed so they may be read from either the bottom of the sheet or the right side of the sheet. Text shall not be placed across roadway centerlines or right of way lines. Text is to be clear of all lines, and should normally be placed outside of the drawing itself. Leader lines shall not cross one another.

The two exceptions to the bottom and right reading text are:

1. All section corner and Township line numbers shall have their tops to the north, and Range line numbers shall have their tops to the west, regardless of the orientation of north to the sheet.
2. All information identifying a center line, such as line designation,

stationing, tick marks, and bearings, shall be placed on top of the line and read left to right, with both the top of the line and left to right being based on the direction of the stationing.

When lines are coincidental, the following order of precedence for placing them on the sheet shall be used:

1. Construction Center Line
2. Right of Way Center Line
3. Range/Township Line
4. Section Line
5. Corporate Limit Line
6. County Line

When Corporate Limit lines coincide with other lines, the Corporate Limits will be labeled in an effort to clarify that the line is also the corporate limits.


Each plan view sheet shall have a north arrow and a scale bar. The north arrow will normally be oriented towards either the top or right side of the sheet.

Plan view sheets and profile sheets that physically show the Begin and End of Project will identify these points as follows:

State funded projects:

Begin Project


SR XX MP XX.XX
LL XX+XX.XX



Federal funded projects:

Begin F.A. No
Begin Project

SR XX MP XX.XX
LL XX+XX.XX



If the Begin and End Federal Aid are different than the Begin and End of Project, this information will be displayed similarly to the above, on a separate leader line drawn to the

appropriate location. Use Begin and End Construction when work is being done on cross roads adjacent to the mainline work or at ramp terminuses.

Each series of plan view sheets, e.g. site preparation, drainage, paving, etc., shall have a legend of features applicable to that series, and the legend will appear on each plan sheet of that series.

The legend is to contain all items that are shown on any of the individual plan sheets in that series. [EXAMPLE] - If your drainage plan series consists of 15 plan sheets, and throughout these 15 plan sheets there are 12 items to be identified in the legend, all 15 of the drainage plan sheets in this series will have a legend that will have all twelve items listed and identified.

If a sheet in the series is too crowded to include a legend, a note shall be added to the sheet to tell the reader on which sheet the legend may be found. The preferred method is to refer the reader to the legend on the preceding sheet.

WSDOT contract plans show the slope of a line in several forms, i.e. ratio, percentage and decimal. When a slope is shown in ratio form, in WSDOT plans, it is shown as run over rise, which is opposite of mathematical standards in which a slope is always given as rise over run in ratio and fraction form. In WSDOT plans, a 4:1 slope means that the slope has a four-foot horizontal run and a one-foot vertical rise. Some WSDOT manuals further clarify the meaning of a 4:1 slope by adding a post test such as 4H:1V, to further clarify that there is 4 units horizontal (run) and one unit vertical (rise). However, WSDOT contract plans will not carry such a post text.

Plan sheets prepared by the Headquarters Architecture Office and their consultants, under the supervision of the Principal Architect, shall be exempt from the requirements of the drafting standards described in this chapter. Drafting for the construction, alteration or repair of WSDOT building projects shall conform to the drafting standards established by the Headquarters

Architecture Office. This includes the architectural plans, civil plans, and other related plans.

450 Plan Sheet Sizes and Layout Format

450.01 General

The Ad set of plan sheets shall be on 11-inch by 17-inch paper.

If the contract plans have more than 225 sheets or contract provisions have more than 225 pages, they will need to be separated into volumes, with no volume having more than 225 sheets or pages. The break for volumes is to be made at a logical point in the package, which may not be at 225 sheets or pages. If a project has 275 plan sheets, and the last 80 are bridge sheets, the logical break would be between the civil sheets and the bridge sheets. If multiple volumes are required for the contract provisions, the logical break would be at the end of a main section. For example, break between HOT MIX ASPHALT PAVEMENT and the following main section, CULVERTS. Do not place the break in the middle of a section.

WSDOT plans and specifications shall be stamped with a seal, signature, expiration date of license, and date signed as required by WSDOT Executive Order E 1012.00.

The following plan sheets prepared by WSDOT are not required to be stamped; index, vicinity map, summary of quantities, quantity tabulations, bar lists, TESC sheets and traffic control plans.

For plans prepared by consultant/developers, the Licensed Engineer's seal, signature, expiration date of license, date signed and logo shall be placed on all plan sheets adjacent to the WSDOT logo, except for the index to the plans, the vicinity map, the summary of quantities, quantity tabulations, and bar-lists are not required to be stamped. This space should be reserved during initial plan sheet layout.

Construction notes shall be numbered consecutively within each plan sheet series of the project. However, only the construction notes that are applicable to a particular sheet series shall be shown on that plan sheet. Once you have created a construction note 1, it will always be the same. Continue sequencing of construction notes consecutively as you add them. **DO NOT** re-sequence from one plan sheet to the next.

460 Plan Sequence

460.01 General

The following outline is the suggested sequence to follow when assembling plans for a construction project:

1. Index.
2. Vicinity map.
3. Summary of quantities.
4. Borrow, pit, quarry, stockpile, waste sites, and reclamation plans.
5. Roadway sections (main roadway, ramps, frontage roads, detours, and others).
6. Grading sections (if applicable).
7. Stage construction plans (if applicable).
8. Alignment / Right of Way.
9. Quantity tabulation sheets (Q-tabs).
These sheets are to be placed immediately prior to the plan sheets showing the work being tabulated, such as site preparation items, Temporary Erosion and Sediment Control (TESC) items, guardrail items, traffic items, etc.
10. Site Preparation (existing topography, and removal and demolition work may be shown on alignment plans; however,

if extensive details are required, should be separate sheets).

11. Existing Utilities (this is an extension of the site preparation plan and is only required if the existing utilities are so extensive that they can not be clearly shown on the site preparation plan).
12. Roadway profiles (normally only required when the grade is being revised).
13. TESC plans (may not be required if work is minor and can be combined with drainage plans or other plan sheets). Refer to [Division 7; subsection 750.27](#) for information on when a TESC plan is required.
14. TESC details.
15. Drainage structure notes (will precede plan series showing drainage features).
16. Drainage plans (may not be required if work is minor and can be combined with another series of plans).
17. Drainage profiles (will follow plan series showing drainage features).
18. Drainage details.
19. Utility structure note sheets (only required if there is work to be done by the contractor on existing utilities).
20. Utility plans (only required if there is work to be done by the contractor on existing utilities).
21. Utility details (only required if there is work to be done by the contractor on existing utilities).
22. Irrigation structure note sheets.
23. Irrigation plans.
24. Irrigation details.
25. Landscape, wetland, rest areas, and viewpoints.
26. Interchange contours.
27. Paving plans are required for overlay projects when paving breaks, paving dimensions, intersection paving, taper lengths and dimensions of taper widths, etc., can't be shown adequately on the roadway sections. In this case, the roadway sections, paving plans and paving detail sheets are to be prepared in conjunction with each other to show all the paving work.
28. Paving details.
29. Minor structures (retaining walls, etc.).
30. Illumination plans (may be shown on paving plans if illumination is minor and paving plan will not be too crowded).
31. Illumination details (will follow plan series showing illumination layout).
32. Traffic signal plans.
33. Traffic signal details.
34. Intelligent Transportation System (ITS) plans.
35. ITS details.
36. Signing specification sheets (will precede the plan series showing the signing).
37. Signing plans (may be shown on paving plans if signing is minor and paving plans will not be too crowded).
38. Signing details (will follow plan series showing signing).

39. Bridges and other structures.
40. Building plans and details.
41. Traffic control plans.
42. Detour routes and detour signing (if the detour is simple and straight forward, this information may be shown on the vicinity map, providing the additional information does not detract from the vicinity map).

The preceding is a list of possible plan sheets, and is not intended to represent a project. The designer is to determine the actual plan sheets required to best depict the project. Each project will require the designer to verify the order of plan sheets to determine what is or isn't required. A basic P1 paver will normally not require as many sheets as a project that has safety, mobility and paving work. Even with logical combinations of plan sheet series, the following basic order of sheets shall be maintained:

1. **item information** (quantity tabulation/ structure notes /sign specifications).
2. **plan series** (the series showing the items of work described on the quantity tabulation/ structure notes /sign specifications sheets).
3. **details** (for work associated with items shown on the plan sheets).

460.02 Index

See [Example 4-1, 4-2](#).

An index is required for all projects with 30 plan sheets or more. A project with more than one volume of plan sheets shall have a complete project index, providing information on all volumes, in each volume.

List the plan sheet titles exactly as they appear on the plan sheets. Avoid sheet titles like "Miscellaneous Details". If a sheet contains

guardrail and drainage details, use "Guardrail and Drainage Details" as the sheet title and on the index. Remember, not everyone that will be using the plans will be as familiar with them as the designer.

On small projects, and as scale permits, the index can be placed on the vicinity map plan sheet. However, DO NOT reduce your vicinity map size to allow you to combine the index and vicinity map as one plan sheet.

Regardless of the size of the project, it is recommended that plan reference numbers be used on all projects in lieu of plan sheet numbers during the design phase.

Plan sheet numbers are not critical during the design phase of the project. Until the design team leader or Region plans reviewer has all of the plan sheets for all separate series (paving, drainage, signing, etc.) to be included in the project, the total number of plan sheets to be included in the contract is unknown.

There are several advantages of using plan reference numbers to identify plan sheets for individual series during the design phase.

1. The designer doesn't have to know the total number of plan sheets included in the contract.
2. Once plan reference numbers have been assigned to individual plan sheets included in a series, these numbers will never have to be changed. This makes referencing details on other plan sheets easy to do and should eliminate the habit of forgetting to do this. Once the statement 'FOR DETAIL SEE [SHEET D12](#)' is placed on the plan sheet, this reference will always be correct unless plan sheet D12 is deleted from the contract.
3. Plan sheets can be inserted or deleted within the series without re-sequencing or renumbering the remaining plan sheets in that series.

460.03 Vicinity Map

See Examples 4-2, 4-3, 4-4, 4-5 and 4-6. Every project will have a vicinity map plan sheet that shows, and has labeled, *all* construction centerlines, detours, and haul routes.

Projects may be broken into sections (see Example 4-3 and 4-4) when it is required or necessary to split the project into different areas.

This is the logical way of showing the work, to be performed, listing quantities, etc., when all the work involved is not conveniently located in one continuous area with no exceptions or gaps.

If the entire project is on one SR (State Route), but has breaks in the areas where work is to be performed between the Beginning of Project and the End of Project, these breaks should be labeled as “exceptions” or “exception areas”. If there are numerous exceptions or exception areas, an alternate method of showing these exceptions is to label as Sections the areas where work is to be performed.

If the project has multiple SRs, where the work is definitely spread out, it is highly recommended that the work be broken into **Sections**.

AN IMPORTANT REMINDER

If the project is broken into sections, make sure all references to a section are exactly the same throughout all plan sheet series (Summary of Quantities, Roadway Sections, Quantity Tabulation sheets, Structure Note sheets, Profiles, etc.) in the plan set for that Section. All exception work areas and gaps must be shown identically in all locations and references throughout the contract plans and specifications.

Project limits are to be referenced to State Route Mileposts (SRMP) based on the State Highway Log (TRIPS System).

Stationing shall be stated at the Begin and End of Project on mainline and the Begin and End of Construction for secondary crossroads.

The Begin and End of Project are defined as follows:

The begin and end of any permanent work on the mainline highway. If the project includes multiples SRs, there is still only one Begin and End Project. Begin Project is assigned to the beginning of permanent work at the most westerly or southerly portion of the project, and the End Project to the most easterly or northerly portion, determined by the general direction of the project activities. Thus projects with multiple SRs may have a Begin Project SR designation different from the End Project SR designation.

The Begin and End of Construction are defined as follows:

The limits of permanent work, such as signing, guardrail, striping, drainage, landscaping, etc., that is performed on city, county or State roadways, when not described as mainline, as a part of the contract.

The Begin and End of federal funding shall be shown and referenced by federal aid number, milepost, and stationing. The federal funding limits will most often be the same as the project limits, but will cover all work.

All equations and exceptions shall be shown on the vicinity map. If the scale of the Vicinity Map is such that equations can be shown with headers and leader lines to the approximate point where the equation is located (by stationing), this is the preferred method to identify the equation. If there is insufficient room on the vicinity map itself (because of scale) to clearly identify the equation and exception areas, they may be shown in tabular form (data box) on the vicinity map plan sheet.

The distance in miles from the beginning of project (BEGIN PROJECT) to the nearest city or town and in the opposite direction from the other end of the project (END OF PROJECT) to

the nearest city or town shall be shown in miles on the vicinity map. Do not use “local” descriptions, such as “10 miles to EZ Corners”. If the nearest city or town is shown on the WSDOT highway map, it should be recognizable enough to be used for this purpose. The city or town shall be one that is shown on the WSDOT highway map.

The vicinity map is the only place in the plans where the overall layout of the main line, ramps, frontage roads, and street locations are shown. County roads and city streets shall be shown and labeled if they are important to the project. Do not show county roads and city streets just to “fill up” the sheet. As with all plan series, delete anything that does not add value to the plan sheet or provide detail or information that your reader does not need.

The scale of the vicinity map shall be large enough to easily identify all construction lines and appropriate local and private streets or roadways. Do not reduce the scale in an effort to “squeeze” it all onto one sheet. A scale bar is to be provided on the vicinity map. In addition to including the scale bar the scale of the plan sheet, detail, etc., will also be shown in text underneath the scale bar.

Material sites, waste sites, stockpile sites, and haul routes will be shown. Do not reduce the scale of the vicinity map so these sites can be shown to scale. If they are too far removed from the project to be shown at the scale appropriate for the vicinity map, they can be shown in a separate box in a corner of the vicinity map sheet at a smaller scale. The haul route from the site to the highway shall be shown, and the distance in miles from the site to the nearest point on the project will be shown or noted.

Features such as railroads, waterways, and streams, as well as over-crossing and under-passing roadways shall be shown and named. Railroads running parallel to the project and adjacent to the right of way, are also to be shown. If the railroad crosses through the project, there is to be a clear indication of whether the intersection is at grade or not.

Wetland and wetland mitigation sites are to be shown on the vicinity map. The designer may have to draw the wetland sites out of scale in order to make them visible.

Bridges within the project (construction) limits shall be identified by bridge number and as being either “INCLUDED IN PROJECT” or “NOT INCLUDED IN PROJECT”. A bridge is “included” in the project if something is being physically done to the structure, such as traffic barrier modifications, deck overlay, widening, earthquake proofing, or expansion joint work. Work that is simply attaching things to the bridge, such as guardrail or conduits, or work that does not affect the bridge, such as striping, would not cause a bridge to be “included in project”.

Cadastral information (Township, Range, section information, etc.) is to be shown on the Vicinity Map and any plan sheets that show dimensioned right of way and/or limited access.

Township, Range and section information will be shown on the vicinity map as follows:

Township and Range lines will be shown and identified if they fall within the limits shown on the vicinity map.

If Township and Range lines do not fall within the limits shown on the vicinity map, Township and Range information will be shown at the top center of the vicinity map plan sheet.

Section lines will be shown with associated section corners, with section numbers. On small projects, or larger scale vicinity maps, this may require the use of break lines to bring the corners within the limits shown. If the corners are found, the ties to center line are to be shown. If there are no section corners within the limits shown, a quarter or sixteenth section line can be shown and the cadastral information (Township, Range, section information,

etc.) given to indicate where in the world we are.

460.04 Summary of Quantities

- See [Example 4-7](#).

The summary of quantities sheet provides a complete tabulation of all bid items and pay quantities that have been determined by the designer/design team to be required for the project. Bid items and quantities are entered into the project estimate via EBASE (Estimate Bid Analysis System). The summary of quantities plan sheet is generated from the estimate database by requesting a summary of quantities report.

The summary of quantities shall be divided into groups, and columns within the groups.

A separate group is required for the following:

1. Whenever there is a change in program item number (PIN).
2. Whenever there is a change in program or subprogram (I2, P1, P2, etc.).
3. Whenever there is a change in funding (any change in funding participants, their individual participation rates, or their source of funding). Funding participants may be the FHWA, a state agency, county, city, other public agencies, private organizations, and participation agreements for work to be done by the contractor.
4. Whenever there is a change in control section.
5. A separate state funded group (one per project) is required for third party damages. The bid item "Reimbursement For Third Party Damage", is to be included in this group.

Each group is required to have at least one column associated with it. Additional columns within a group are required for the following:

1. Each bridge and structural retaining wall (those covered by Standard Specification Section 6-11 through 6-17) wall shall have its own column in order to identify materials quantities required to construct this item.
2. Each state furnished pit site (mandatory or not) shall have its own column.

There are exceptions that will be allowed for item number 1 above. For projects with a single wall or a single bridge, or both, the wall and bridge quantities may be entered into a single column or combined with another column. For projects with multiple walls, if the materials quantities required for each wall are clearly tabulated in the plans, these walls quantities may be entered into a single column or combined with another column in the Summary of Quantities.

In addition, when paving across multiple bridges, the paving quantities need not be separated out for each bridge and may be included in mainline paving quantities in the Summary of Quantities.

The intent of item number 1, above is to be able to identify the quantities of work at each wall or bridge during construction activities.

The designer is advised to use additional columns within groups to show quantity breakouts for individual construction lines. For example, by using separate columns for the main line, a frontage road, and each ramp, it is much easier to track and make quantity revisions during design, and much easier to track quantities for over- or under-runs during construction, than it is if all of the quantities are combined in a single column.

The quantities for the following types of items will appear only in the summary of quantities:

1. Lump sum items (an LS will appear on the summary of quantities for these items -- the approximate quantity for lump sum items will appear in the special provisions).
2. Force account items.
3. Water.
4. Aeration items.
5. Structure items, such as bridges, and structural retaining walls, etc. (although separate quantity tabulations are desirable for structural retaining walls when there is more than one wall in a project).
6. Borrow materials.
7. Surfacing materials.
8. Paving materials.
9. Temporary erosion and sediment control items and Topsoil (unless the specific areas of Topsoil placement can better be defined by showing quantities on the profiles or a specific plan sheet).
10. Sign covering.
11. Sequential arrow sign.
12. Contractor piloted traffic control.
13. Traffic control labor.
14. Construction signs Class A.
15. Traffic control supervisor.
16. Traffic control vehicle.
17. Spill Prevention Plan.
18. ESC Lead.

Bid items shall be listed in the same order as they appear in the current Standard Item Table.

Bid items not listed in the Standard Item Table shall be intermixed, according to type of work, with the bid items that are listed.

Bid item names for nonstandard bid items shall be singular in form. See [Section 750.23](#) for additional information on standard items.

The Standard Item Table provides useful information to the designer in the last column to the right on this table (Item Use Message).

Listed in this column is a statement that will tell the designer what, if anything needs to be done if this bid item is used in the project. Some of the statements that are listed in this column are as follows with a definition of the statement:

STANDARD ITEM

Indicates that this bid item is a standard item and is covered in the Standard Specifications. The designer may not need to do anything to revise or supplement the information provided in the Standard Specifications.

However, the designer must decide if information concerning this bid item as addressed in the Standard Specifications is sufficient or if more "project specific" information is required.

REQUIRES SPECIAL PROV.

Indicates that the designer needs to do one of the following:

1. Revise the appropriate section or sections in the Standard Specifications.
2. Supplement the appropriate section or sections in the Standard Specifications.
3. Write a "stand alone" project specific specification because the Standard Specifications do not

contain information or direction for this item of work.

STD. ITEM, GSP REQUIRED

Indicates this bid item is a standard item, is covered in the Standard Specifications and there is a GSP (General Special Provision) that needs to be included in the contract special provisions when this bid item is used. It is the designer's responsibility to ensure the GSP is applicable or "project specific" to the contract.

GSP ITEM

Indicates that a GSP exists and must be included in the contract special provisions. It is the designer's responsibility to ensure this GSP is applicable or "project specific" for the contract.

AMENDMENT ITEM

Indicates that an Amendment exists and must be included in the contract special provisions when this bid item is used.

REQ SPECIAL, HQ APPROVAL

Indicates that when this bid item is used, a project specific special provision must be written and Headquarters Construction Office approval must be given prior to including this special provision in the contract.

HEADQUARTERS USE ONLY

Indicates this bid item will be included in contracts only when directed by Headquarters Construction Office.

TECHNICAL SPECIFICATION

Indicates this bid item will require a technical special provision to be written. Architects generally write this type of special provision. These bid items are typically used only for architectural type work (building construction at ferry terminals and rest areas, etc.)

SUPERSTRUCTURE ITEM

Indicates this bid item is to be used in conjunction with Standard Bid Item 4300

ONLY. The 9000 series bid items are to be used only to provide lump sum breakout data for bid item 4300 "Superstructure - XXXXXX".

DO NOT use the 9000 series bid items as stand alone bid items in your contract estimate.

A quantity shall not be duplicated within the body of the plans. The item totals shown in the summary of quantities shall be the sum of the quantities shown for the item throughout the plans. Quantities are typically listed in the quantity tabulation, structure notes and profile plan sheets. When quantities for an item appear in places other than where your reader would expect to find them or when quantities for an item appear in two or more places throughout the plans, a cross-referencing statement, such as "FOR ADDITIONAL QUANTITIES - SEE SHEETS Qnn and Wnn", shall be included.

Quantities for such work items as pigmented sealer, whose cost is included in the cost of the associated concrete, are shown in the plans for the sole purpose of aiding the contractor in the bidding process, and shall be accompanied by the note, "Informational Only."

Care must be taken when calculating quantities for surfacing and paving materials to ensure reasonable accuracy. The Design Manual contains units and conversion factors for estimating surfacing and paving quantities.

Quantities listed in the summary of quantities are intended to be representative of the work to be performed. Rounding will take place each time a quantity is placed on a quantity tabulation sheet, on a profile sheet, or other location in the plans. The total of the rounded quantities will be carried forward to the summary of quantities.

The following general rules shall apply to the rounding of quantities:

1. Items having an estimated unit price of \$9.99 or less will be shown to the

highest multiple of 10; for example, 3,640 (not 3,637) units of haul at \$0.50, and 560 (not 554) tons of ballast at \$1.25.

2. Items with an estimated unit price of \$10.00 to \$99.99 will be shown to the nearest full digit; for example, 61 (not 60.5) cubic yards of concrete at \$43.00.
3. Items with an estimated unit price of \$100.00 or more will be shown to one decimal place; for example, 18.3 (not 18.25) acres of clearing at \$1500.00.
4. Exceptions to numbers 1, 2, and 3 above:
 - a. Earthwork items, roadway excavation, embankment compaction, and borrow excavations are to be rounded to the nearest multiple of 10 units, regardless of price. The rounding for roadway excavation and embankment compaction will be made for each entry on the profile sheets. The borrow quantities will be rounded to the nearest 10 units and placed on the summary of quantities. On a new construction project, with extremely large earthwork quantities, the quantities could even be rounded to the nearest 50 units at each entry on the profile sheets.
 - b. HMA and crushed surfacing items are to be rounded to the nearest 10 units.
 - c. Pipe items will be rounded to the nearest foot for each pipe run entered on the structure note sheets, regardless of price.

A good source to use for determining the estimated unit bid prices for quantity rounding purposes is the **WSDOT UNIT BID ANALYSIS AND STANDARD ITEM TABLE**. If this is not available through your Region Intranet Home Page, it can be accessed via the WSDOT Internet pages through the Project Development Home Page. Use the **UNIT BID ANALYSIS STANDARD ITEM TABLE** button to start this application.

460.05 Contract Reclamation Plans

- See [Example 4-8](#).

A Contract Reclamation Plan will clearly set forth all reclamation work to be accomplished in the contract.

A Contract Reclamation Plan is required for every WSDOT contract that contains a WSDOT furnished material source. The Contract Reclamation Plan will be based on the Ultimate Reclamation Plan. A reproducible (reverse reading mylar) of the approved Ultimate Reclamation Plan can be obtained from the region Materials Laboratory. This plan will be modified to create a Contract Reclamation Plan. The Contract Reclamation Plan will be included in the contract plans.

By RCW 78.44, the approved ultimate REC plan has to be followed or WSDOT is subject to fines for each incident. If the contract work requires deviation from the ultimate REC plan, a modification to the ultimate REC plan has to be submitted for Department of Natural Resources (DNR) approval prior to beginning work at the site.

In some cases, Contract Reclamation Plans need to be developed during Contract Plan preparation for sites that do not have Ultimate Reclamation Plans. Materials sources located on Federal Land or sites smaller than three acres in area usually do not have Ultimate Reclamation Plans.

The Contract Reclamation Plan shall show the following:

1. The existing contour lines shown on the Ultimate Reclamation Plan when it was approved will be updated to show the topography as it exists immediately prior to the contract. Only the contours in the portion of the site affected by your project need be shown, not the contours for the entire site.
2. The contractor's designated work area will be noted.
3. The available raw material will be indicated, or, when appropriate, a note may be added on the plan stating that sufficient raw material is available for the project.
4. A block detailing materials to be produced and reclamation items needed under this contract.
5. The interim and reclaimed slopes shall be no steeper than the slopes on the Ultimate Reclamation Plan.
6. Specific directions for excavation will be added as a note, e.g., "Excavation shall progress to full depth from the existing face of excavation toward the southeast."
7. Only notes on the Ultimate Reclamation Plan that are applicable to work being performed under the contract are to be included on the Contract Reclamation Plan.
8. Other notes and information necessary to the specific contract will be added. It is the intent that the Contract Reclamation Plan stand alone for the work (reclamation) to be accomplished under the contract.

It is the designer's responsibility to verify with the region Materials Laboratory that the quantity of available material is accurate, and that it is possible to produce all the materials listed within WSDOT specifications. If the contractor

will be required to perform some special or extra work to manufacture material that meets the specifications, the special or extra work requirements are to be included in the special provisions.

Quantities for stripping, clearing and grubbing, and all other items of work to be performed within a site, shall be tabulated on the plan. If it is a non-mandatory site, the items of work shall be site specific ("Clearing and Grubbing - Site QS-A-495"). If the site is mandatory, the work will fall under the general contract work item ("Clearing and Grubbing"), but will be shown in a separate column.

Identification numbers for stockpile and waste sites are assigned by the regional Materials Laboratory. Although a Contract Reclamation Plan is not required for stockpile or waste sites, the Plans shall indicate any restrictions on the use of such sites.

Access to the sites shall be shown. If an access road is to be built, rebuilt, or widened, indicate the width of right of way, and clearly identify all work to be performed by the contractor on the access roads as a part of the contract. How the contractor will be paid for the access road work will be outlined in the contract provisions.

Agreements are required with the owners of all roads that make up the haul route. These agreements will indicate WSDOT's and the contractor's responsibilities for returning the roadway to the "before hauling" condition.

460.06 Roadway Sections

- See [Examples 4-9, 4-10, 4-11, 4-12, 4-13, and 4-14.](#)

Roadway sections are to provide complete geometric information on the roadway cross section from the sub grade up and general information left and right of centerline. The information on the roadway sections will tie directly to the paving plans and the profiles, if these series of plans are included in the project.

On federal aid projects, future paving and surfacing depths, required to bring the roadway to the ultimate design cross section, shall be shown in order to qualify for future participation by the FHWA.

Roadway sections are required for every combination of surfacing and paving depths used on the mainline, ramps, detours, frontage roads, road approaches, city streets, etc.

Roadway sections are to represent conditions from the sub grade up for the entire length of the construction line(s) (mainline, ramps, detours, frontage roads, road approaches, city streets, etc.) included in the project. Start at the beginning station on an alignment and identify all stationing to the end of line without gaps or overlaps.

When drawing roadway sections, it is recommended that proportional scaling be used to indicate lane widths and depths of materials to be placed. A 12 foot lane should be drawn so that it appears slightly larger than a 10 foot shoulder. A 0.15 foot lift of HMA should be drawn so that it appears approximately one quarter of the thickness of a 0.60 foot lift of gravel base course.

Roadway sections should be drawn to reflect how the work is expected to be performed in the field. If HMA is to be placed in multiple lifts, draw the roadway section to reflect this fact by showing the number of lifts with required depths of each lift. Show each lift with an edge line that would indicate where each lift would end left and right of center line. **DO NOT** simply draw each lift of HMA to extend out into the shoulder, unless this is exactly how the HMA is to be placed.

Variable dimensions (Example: Varies 2' to 10') may be used to represent differences in shoulder or lane widths, or transition areas, as long as there is a paving plan that clearly shows, by stationing, the actual widths desired. If the project is a pavement overlay project and no paving plan is going to be provided, the use of variable horizontal dimensions is discouraged,

unless construction notes are used to describe, by stationing, where the variable paving widths or transitions begin and end.

A generic roadway section for bridges must be provided to avoid having gaps in stationing. If the bridge is being overlayed, additional detail will be required. When a project has a structure on main line or a secondary line, that is not included in the project, a paving exception should be noted on the roadway section sheet.

Bridge approach slabs, if required, shall be shown as a separate roadway section.

Station equations, and paving or project exceptions are to be shown in proximity to the roadway section to which they apply.

Each roadway section in the project shall show the following applicable items:

1. Horizontal dimensions of the roadways, as approved in the Design Decision Summary.
2. Project specific design details and features required, such as curbs, sidewalks, riprap, etc.
3. The depths of surfacing and paving.
4. Station to station limits for each line represented by the roadway section.
5. The position of the profile grade, the pivot point for super transition, and the construction center line.
6. The depth from profile grade to the roadway surface being constructed, if the project does not include ultimate design surfacing. This depth shall be labeled "Future".
7. The type, width, and thickness of the existing surface, if the characteristics of the existing surface will affect construction.

8. A general note indicating that all surfacing and paving depths are compacted depths and courses shall not exceed depths defined in the Standard Specifications.
9. The roadway ditch depth shall meet the design criteria as stated in the Design Manual. A slope table should be used when embankment and excavation heights vary enough to require different slope rates. Show side slopes for embankment sections, in-slopes and back slopes for excavation areas.
10. A section showing shoulder widening for guardrail. If shoulder widening for guardrail is isolated to one or two roadway sections, it can be shown as part of the particular section. If shoulder widening for guardrail applies to several roadway sections, a separate shoulder widening section can be drawn and referenced from the applicable roadway sections.
11. A section showing the shoulder design on the outside of a curve (superelevation section) if the project involves constructing subgrade on the outside of curves. This is a standard CADD detail and need only be shown once.
12. A surfacing legend is to be shown on each sheet indicating the type of surfacing material, with the exact item name as found on the Summary of Quantities. For HMA it is necessary to indicate the class of material used but not the performance grade (PG) when only one grade is used for the entire project. If however there are two or more performance grades used on the project then they must all be detailed on the roadway sections. Each type of material shall be assigned an identifying number enclosed by a hexagon symbol.
13. Construction notes shall be numbered consecutively for the project, but only the construction notes that are applicable to a particular sheet will be shown on the sheet. Once you have created a construction note 1 it will always be the same. Continue sequencing of construction notes consecutively as you add them. **DO NOT** resequence from one plan sheet to the next.

For example:
Sheet R1 may have construction notes 1, 2, 3, and 4.
Sheet R2 may have construction notes 1, 3, and 5. (Notes 1 and 3 on sheet R2 would be identical to notes 1 and 3 on sheet R1 and note 5 on R2 is a new note, consecutively numbered).
14. If the total paving depth for a class of HMA exceeds the nominal compacted depth specified in the Standard Specifications, one of the following methods of indicating the paving requirements will be used:
 - a. Multiple lifts shall be drawn on the roadway section, indicating the desired minimum compacted depth of each lift.
 - b. Provide a construction note for the roadway section specifying the number of lifts required and the maximum allowable compacted depth for any lift.

If you don't show paving depths in your roadway sections as specified in 14a or 14b above and the paving depths for your project exceed normal depths (as indicated in the Standard

Specifications), you should take another look at Section 5-04.3(9). In part it reads:

5-04.3(9) Spreading and Finishing

The mixture shall be laid upon an approved surface, spread, and struck off to the grade and elevation established. HMA pavers complying with Section 5-04.3(3) shall be used to distribute the mixture. **Unless otherwise directed by the Engineer, the nominal compacted depth of any layer of any course shall not exceed the following :**

The bold sentence in the preceding paragraph is where our plans get us in trouble if they are not in accordance with 14a or 14b above.

When roadway sections show paving depths that exceed the allowable depths listed in the Standard Specifications. The depths shown in the Plans will govern in accordance with the order of precedence (Section 1-04.2).

460.07 Grading Sections

- See [Example 4-15](#).

These plan sheets will show such items as types of embankment, use of waste in slope flattening, drainage layers, composite sections, relief ditch details, slope tables, unsuitable stripping depth tables, controlled blasting slopes, wetlands sections, horizontal drain details, surcharge details, large unsuitable foundation excavation and backfill areas, and soil stabilization details. Most projects will not require grading sections.

460.08 Quantity Tabulation Sheets

- See [Example 4-17 Appendix 1](#).

Quantity tabulation sheets are used to tabulate the locations, quantities, and notes pertaining to specific bid items.

The following types of items will normally appear on quantity tabulation sheets:

1. Removal items (except items paid by lump sum).
2. Asphalt concrete curb and asphalt concrete gutter.
3. Timber and lumber (except bridge items).
4. Cement concrete approach.
5. Cement concrete curbs, and curb and gutter.
6. Guardrail items, including anchors, terminals, and transition items.
7. Concrete barrier items.
8. Impact attenuators.
9. Guide posts.
10. Raised pavement markers, paint lines, and pavement marking items.
11. Conduit pipe (except bridge, illumination and traffic signal system items).
12. Wildlife reflectors.
13. Steel reinforcing bars and wire mesh (except bridge structural retaining walls and drainage items).
14. Monument cases and covers.
15. Cement concrete sidewalk.
16. Asphalt concrete sidewalk.
17. Concrete slope protection.
18. Fencing items, including gates, and end, corner and pull posts.

19. Adjustment items.

20. Delineation lights.

Quantity tabulation sheets are to be prepared on 11-inch by 17-inch paper sheets printed from excel files. The excel spreadsheet program is available through the Regional Plans Offices or the Headquarters Project Development Branch. For additional information and instructions for this excel spreadsheet, (see [Appendix A1](#)).

Standard sheets have been prepared with the heading “Quantity Tabulation”. A descriptive addition (see types of items above) may be added after the plan sheet heading “QUANTITY TABULATION- XXXXXXXX XXXXXXXX” to indicate what type of work is included on this plan sheet.

Quantity tabulation sheets are to be placed immediately preceding the plan sheets that contain the tabulated items. This will intersperse them throughout the plans.

For projects involving only a few items, the quantities may be placed in data boxes on appropriate plan sheets or on profile sheets, eliminating the need for quantity tabulation sheets. Data boxes should be laid out in the same manner as the Q-tab sheets.

Blank columns shall be provided between listed bid items and blank rows shall be provided in station listing (about every fifth entry and a space or two between each reference sheet listed). This procedure allows for the addition of bid items and stationing with ease, even during the addendum phase.

The bid items shall be placed from left to right in the same order in which they appear in the Estimate.

Bid items shall be identified on the Quantity Tabulation sheets exactly as they appear in the WSDOT spec book (spelling, punctuation, spacing, etc.) and in the same order as they appear on the Summary of Quantities.

If there are more bid items to be tabulated than will fit across the top of the sheet, with the appropriate blank spaces, additional tabulation sheets will be required. The station listing will be identical for the continued sheets. Likewise, if there are more station listings than will fit on a single sheet, with the required blank spaces, additional tabulation sheets will be required. The bid items across the top will be identical for the continued sheets.

Each time an item is used in a different location, it will have a separate quantity entry. Related items, however, may be included in a single entry if the station limits are the same. For example, a single entry could include the type of guardrail, required anchors, and transition types.

Each quantity entered on the quantity tabulation sheet is to be rounded appropriately at the time of entry. Do not add up the unrounded quantities and round the total to carry forward to the Estimate/Summary of Quantities. See the information on rounding in [Section 460.04](#).

The bid item totals on the Quantity Tabulation sheets must be consistent with the bid item totals entered in the Estimate.

The **Code** column shall contain the quantity tabulation code number, which is made up of the Plan Reference No. and the number identifying the individual construction feature on the sheet. (P1-1, P1-2, ... P1-6, P2-1, P2-2, ... P2-26) The numbers shall be listed in ascending order of plan sheets.

Bid items, identified by station(s) and quantity or quantities, on individual quantity tabulation sheets are tied directly to the plan sheet series they are related to by the number immediately following the Plan Reference No. as mentioned above. The related series sheet shall have its own consecutive series of numbers identifying construction features (octagonal enclosed numbers beginning with number 1) beginning in the top left corner of the sheet and progressing across and down the sheet. A light, arrow-less line shall be drawn from the octagon to the construction feature. When a construction

feature is continued on more than one sheet, the octagon, on the continued sheet, shall be divided with a horizontal line, and the plan sheet reference number on which the construction feature first appears shall be inserted in the upper half and the first sheet individual identifying number shall be inserted in the lower half. A larger scale octagon may be used if this is done. The octagonal symbol shall not be used for any other purposes.

For items such as pavement markings, that are continuous for the entire project, list the station limits and leave the code column blank.

The General Notes will include information required to complete the data for a particular construction feature, such as:

1. Guide post type and color.
2. Wildlife reflector type.
3. Guardrail placement case, terminal connection, alternate anchor type, connection type when connecting transition to stiffer barrier, such as bridge rail.
4. Acceptable impact attenuators for each location.
5. When making a reference in the General Notes to a special provision in the contract, do NOT use the statement "SEE SPECIAL PROVISIONS". Identify the special provision exactly by name.
6. When making a reference in the General Notes to a detail in the contract plans, do NOT use the statement "FOR DETAIL SEE PLANS". Identify the exact plan sheet (using the Plan Reference No.) where the detail is located.
7. When making a reference to the Standard Plans, give the full Standard Plan number.

8. Type of curbing to be used.

If the quantities for an item appear on other plan sheets, in addition to the quantity tabulation sheets, cross-references shall be made to the sheets where the additional quantities can be found.

460.09 Alignment / Right of Way Plan

- See [Examples 4-16](#) and [4-18](#).

The alignment and right of way information will appear on the same series of plan sheets for most projects.

Right of way is required to be shown for projects having work outside of the existing toe of fills or existing bottom of ditches. If the widening work is sporadic throughout the project, it is permissible to show the R/W only in the areas of the widening. If the areas are closely spaced, it is best to provide the R/W through the entire area, or the whole project, as opposed to showing a section of R/W for 100 feet, then a 100 foot gap, and then another 100 foot section.

If R/W information is not required, as for a paving project, for example, the alignment information could be shown on another plan series, such as the site preparation plan series or the paving plan series, as long as the additional information does not cause overcrowding of the plan sheet.

Site preparation information may appear with the alignment and right of way plan series only if there is minimal existing topography and minimal site preparation work to be shown. If there is considerable topography or a great deal of site preparation work to be shown, the information is to be placed on a separate plan series.

The following information will normally appear on the alignment / right of way plan series:

1. Construction center lines for all roadways being constructed.

2. All stationing, bearings, and curve data associated with each construction center line (for new construction ramp stationing will *always* run in the same direction as the mainline stationing).
3. Right of way center line (not always required - see discussion below).
4. Right of way lines (*all* R/W lines, without exception, will *always* be solid lines on the contract plans).
5. Ties of all right of way breaks to either the right of way or construction center lines (show both station and offset distance).
6. Construction permits with private citizens, and all easements, identified by type and use.
7. Ties of all construction permits and all easements to either the right of way or construction center line (show both station and offset distance).
8. Township and Range lines that cross center line, with appropriate descriptive information (bearing and distance to found corners), including center line stationing at intersection point.
9. Limited access hachures when appropriate (hachures need to be drawn to the correct stationing, but the stationing of the ends or breaks in limited access do not have to be identified on the construction plans).
10. Found section corners and monuments, with station and offset ties to construction center line.
11. Station and offset ties to railroads and railroad rights of way that intersect the project or are affected by the project.
12. Corporate limit and county lines with station identification where they cross the construction center line.
13. Names of rivers, streams, bays, and inlets, their direction of flow, meander lines, ordinary high tide or high-water lines of navigable waterways.
14. On all projects that include grading, the slope catch lines shall be shown. It may be desirable to show slope catch lines on the drainage plan, however, the right of way line must also be shown on the drainage plan if this is done.
15. The outline of sand drainage blankets, unsuitable foundation excavation, and toxic waste excavation areas.
16. Show all found property corners along WSDOT R/W lines with a note stating "Per RCW 59.09.13 any monument or corner disturbed by the Contractor's operation shall be replaced at no cost to the Contracting Agency".

When the right of way center line is coincidental with the construction center line, an equation shall be provided at the begin and end of project, to show the relationship between the official right of way stationing and the construction center line stationing. An equation will be provided to show relationship between the construction center line and the right of way center line at the location of right of way plan equations. All right of way offsets and associated stationing will then be referenced to the construction center line.

When the right of way center line is *not* coincidental with the construction center line, the same procedure described in the previous paragraph may be used. The offset distance between the right of way and construction

centerlines shall be shown at the begin and end of project. In addition to the equations at the begin and end of project, equations shall be shown at all points where the right of way and construction center lines cross and at the location of right of way plan equations.

The official right of way plans may be included in the contract plans under the following circumstances:

1. The official right of way stationing runs the opposite direction of the construction stationing.
2. The right of way alignment is substantially different than the construction alignment and is not easily tied. As an example: the right of way alignment has numerous curves that do not exist in the construction center line and the right of way would have to be described using metes and bounds as opposed to offsets from the construction center line.

If either of the two circumstances above exist, the designer needs to contact the Headquarters R/W office and request that they prepare the existing right of way plans to be included in the contract plans. The designer will have to provide the R/W office with the equation relating the begin and end of the project construction center line to the existing R/W stationing. If this option is used, the Headquarters R/W office needs to be notified early in the design process so that the work can be added to the Headquarters R/W office schedule, to ensure that the plans can be prepared within the PS&E schedule.

If the project requires profile sheets be included in the contract plans, the layout of the alignment plan sheet must take into account that the station limits on each profile plan sheet are to match exactly the station limits of each alignment plan sheet. Horizontal alignment and steep grades can each affect the matching of stationing limits between the alignment and profile sheets, so

they must be examined together. The alignment and profile may be shown on the same plan sheet by using the plan/profile sheet.

Township and Range information is to be shown on the vicinity map. It does not have to be shown on the alignment plans unless one or both of the following cases occur:

1. The Township or Range lines cross the centerline, in which case the line will be shown with the station of the intersection identified.
2. Right of way boundary lines are shown WITH dimensions from the roadway alignment.

Section lines only have to be shown on the alignment plans if the section corners are found, requiring the ties to centerline be shown.

The following information will be shown for all horizontal alignments:

1. Line identification, using alpha designation, and stationing (M 5+50).
2. Station ticks shown on the top side of the alignment line (top as related to the direction of the stationing).
3. Tangent bearings.
4. Point of curvature (P.C.) and point of tangency (P.T.) for all horizontal curves.
5. Angle points (A.P.) in horizontal alignments.
6. Curve data box showing:
 - a. station of the point of intersection (P.I.) of bearings for each curve.
 - b. delta for each curve (deflection angle between intersecting bearings).
 - c. radius of each curve.

- d. tangent length for each (distance from P.C. and P.T. to the P.I.).
- e. length of curve for each curve (distance from P.C. to P.T. along the horizontal curve).
- f. full super rate for each horizontal curve.

Construction stationing shall increase from the beginning of the project to the end, and shall run from south to north on odd numbered highways, and west to east on even numbered highways.

All ramp stationing for new construction shall increase in the same direction as the mainline stationing. Ramp stationing should begin at station 10+00 to avoid negative stationing due to alignment changes.

Offset equations shall be shown on the construction plans as follows:

1. The secondary line (ramp, cross-road, or right of way center line) designation and station is listed first.
2. The mainline (construction center line) designation and station, perpendicular distance, and left or right is listed next. The direction (left or right) is referenced from mainline looking ahead on line.

Linear equations should not be an issue if the designer establishes construction stationing for the project, instead of using right of way stationing. If linear equations are present, the designer must make sure that they are gap equations and not overlap equations. Overlap equations cause confusion because of the duplication of stationing caused by the overlap. To convert an overlap equation to a gap equation, a 1 can be added in front of the Ahead station (5+00 would become 15+00), or by adding 1 to the first digit of the Ahead station (110+00 would become 210+00).

Examples:

Overlap equation 10+00 BK =
 5+00 AHD

add 1 in front of the Ahead station would become

Gap equation 10+00 BK =
 15+00 AHD

Overlap equation 150+00 BK =
 110+00 AHD

add 1 to the first digit of the Ahead station would become

Gap equation 150+00 BK =
 210+00 AHD

When showing the equation on the plans, the BACK station goes on the back-side of the equation line and the AHEAD station goes on the ahead-side of the equation line.

460.10 Site Preparation

- See [Example 4-18](#).

The site preparation series of plans is where all existing topography within your project limits is to be shown, as well as all the removal and demolition work involved with your project.

If there is very little topography to be shown and very little removal and demolition work to be performed, this information can be shown on the Alignment/Right of Way plan series as long as it does not compromise the information required on the Alignment/Right of Way plans.

The construction center lines will be shown on the site preparation plans, but lanes, shoulders, and other features being constructed are not to be shown.

Removal and demolition of existing features, paid as separate items, are to be identified using Quantity Tabulation notes.

Items included in the lump sum price for “Removal of Structures and Obstructions”, are to be identified with notes located directly on

the appropriate plan sheet. For example, removal of wire fence should be identified with a note such as “wire fence to be removed”. Items of work included in the lump sum price for “Removal of Structures and Obstructions” that cover the entire project, removal of guide posts for example, do not have to be identified on the plan. Items of work being paid as “Removal of Structures and Obstruction” will not appear on quantity tabulation sheets.

If large, complete areas of pavement, sidewalk, or curbs and gutters are being removed, it is best not to use cross-hachuring to identify these areas. It will suffice to show the limits of the removal and identify the area with a Quantity Tabulation note, or note on the plan sheet “begin pavement removal/end pavement removal”. If there are a number of small isolated areas of pavement removal, cross-hachuring may be used to identify these areas. Large areas of cross-hachuring actually detract from the plans and often hide important information.

460.11 Profiles

- See [Example 4-20](#).

Roadway profiles are required only when there is a change in the vertical alignment of the roadway under construction. If only a section of the vertical alignment is changed, a profile is required only for that section.

The station to station limits shown on each profile sheet match exactly the station to station limits shown on the corresponding alignment sheet.

The following information is required on profile sheets:

1. The limits of roadway sections will appear with arrows. (These are always to be the top most entry on the profile sheets.)
2. Superelevation diagrams (these should be shown on a separate sheet if they cause crowding of other required information).
3. The finished profile grade line will be shown as a heavy solid line.
4. The datum symbol with North American Vertical Datum (NAVD) 88 is to be shown on the first roadway profile sheet only.
5. Show benchmarks that exist in the area of the alignment profiled on the sheet (both temporary and permanent benchmarks). Be sure to include all pertinent information associated with the bench mark (e.g. location, offset, stationing, elevation of bench mark, etc.)
6. Beginning station and elevation (BVC) and ending station and elevation (EVC) of each vertical curve will be shown. Elevations and stations through each vertical curve will be shown on even stations at intervals of 50 ft. minimum to 200 ft. maximum.
7. The station and elevation of the point of intersection of the gradients (VPI) will be shown.
8. Gradients between vertical curves (shown as a percentage, carried out to a sufficient number of places so that the calculation from the elevation at one VPI on the given gradient will give the elevation at the next VPI).
9. Length of each vertical curve.
10. Elevation and station at each break (angle point; AP) in gradient with elevation shown to 0.01 foot.
11. The existing ground line will be shown as a dashed line.
12. Areas of work or quantities will be shown, with arrows, between the station to station limits of the work, or

at 10 station (1000') totals if the work extends beyond 10 station totals, or at other logical breaks, such as bridges or group breaks. If these logical breaks are slightly more or less than 1000 feet apart, it would be appropriate to have a 1300 foot total or a 700 foot total.

13. Quantities to be shown will be roadway excavation, controlled blasting, vertical sand drains, unsuitable foundation excavation, toxic waste excavation, embankment compaction, special backfill, clearing and grubbing, seeding, compost, topsoil and fertilizing and mulching.
14. The use of the term "embankment" by itself is permitted only when Method A compaction is specified. In this instance, it must be noted that embankment quantities are shown for informational purposes only.
15. Details showing side slopes for unsuitable foundation excavation and toxic waste excavation shall be shown on the profiles or detailed on separate sheets. The bottom of unsuitable foundation excavation and toxic waste excavation will be shown, but should be shown as a squiggly line to indicate that the actual bottom elevation of the excavation is unknown.

The designer needs to give some thought to the layout of the profile sheets prior to placing information, because the layout is to be the same on each profile sheet in the series. All quantity arrows are to be placed in the same position on each sheet to allow quantities to be located easily.

If there is only minor grading on the project, and profile sheets are not used, 10 station totals, or similar quantity breakdowns, will be shown on a quantity tabulation sheet.

460.12 Structure Notes

- See [Example 4-21](#).

All of the information shown on the structure note sheet, and the drainage plans and profiles, will meet the requirements contained in the Hydraulics Manual and Standard Plans.

Structure note sheets are used to tabulate locations, bid items, quantities, and notes pertaining to the drainage items, utilities, water lines etc.

The structure note sheets are to be on 11-inch by 17-inch paper sheets printed from excel files, or plotted from CADD. The excel spreadsheet is available through the Regional Plans Offices or the Headquarters Project Development Branch. For additional information and instructions for this microcomputer spreadsheet, see [Appendix A1](#).

Standard sheets have been prepared with the heading "Structure Notes." A descriptive addition, such as "Utilities," or "Irrigation," shall be added after the plan sheet heading "STRUCTURE NOTES - XXXXXXXX XXXXXXXX" to indicate what type of work is included on this plan sheet. Structure Note sheets are to be placed immediately preceding the plan sheets that contains the features being tabulated.

For those projects involving only a few drainage bid items at a few locations, the information normally provided on structure note sheets may be provided on the appropriate plan sheets, in either a tabular form in data boxes, or placed in a convenient location on the sheet with a leader line used to connect the information with the corresponding drainage feature.

Blank columns shall be provided between listed bid items and blank rows shall be provided in station listing (about every fifth entry and a space or two between each reference sheet listed). This procedure allows for the addition of bid items and stationing with ease, even during the addendum phase.

The bid items shall be placed from left to right in the same order in which they appear in the Estimate.

Bid items will be identified on the Structure Notes plan sheets exactly as they appear in the WSDOT Standard Item Table (spelling, punctuation, spacing, etc.).

If there are more bid items to be tabulated than will fit across the top of the sheet, with the appropriate blank spaces, additional tabulation sheets will be required. The station listing will be identical for the continued sheets. Likewise, if there are more station listings than will fit on a single sheet, with the required blank spaces, additional tabulation sheets will be required. The bid items across the top will be identical for the continued sheets.

Each time an item is used in a different location, it will have a separate quantity entry. Related items, however, may be included in a single entry if the station limits are the same. For example, a single entry could include a catch basin, pipe, structure excavation and riprap.

Each quantity entered on the structure notes plan sheet is to be rounded appropriately at the first point of entry. Do not add up the unrounded quantities and then round the total to carry forward to the Estimate. See the information on rounding in [Section 460.04](#).

The **Code** column shall contain the structure code number, which is made up of the Plan Reference No. and the number identifying the drainage features on the sheet. (D1-1, D1-2, ... D1-6, D2-1, D2-2, ... D2-26) The numbers shall be listed in ascending order of plan sheets.

Indicate the construction center line stationing on the structure note sheet for cross culverts, and indicate station and offset for each end of longitudinal pipe installations. If a sanitary or storm sewer line stationing is used, the sewer line stationing will be used on the structure notes and the plan sheets will indicate the appropriate ties to the construction center line.

The bid item for storm sewer pipe will be “Schedule ____ Storm Sewer Pipe ____ In. Diam.” A table indicating the acceptable pipe alternates is included in Section 7-04 of the Standard Specifications. There will be times when not all of the pipes shown as acceptable alternates in the table will be acceptable because of conditions on a specific project. When there are pipes not acceptable for a specific project, the designer will include a general note on the structure note sheet identifying the unacceptable pipe type. The Hydraulics Manual contains a complete discussion on storm sewer pipes and is to be used for guidance.

When WSDOT does sanitary sewer pipe work, it is usually to extend or replace a system affected by the highway work. The utility or local agency will normally specify the type of pipe, or specify the pipe extension or replacement to be in kind. The system owner’s request for pipe type is to be placed in the PSE portion of the project file to serve as backup justification. The bid item will be the pipe type requested by the owner, and the general note on the structure note sheet will read either “no acceptable alternates” or “replace in kind”, whichever is appropriate.

The General Notes will include information required to complete the data for a particular drainage feature, such as:

1. Acceptable or unacceptable pipe alternates for drain, underdrain, and culvert pipes.
2. Unacceptable alternates for culvert and storm sewer pipes bid on a schedule basis.
3. The appropriate treatment for pipes, except when the treatment is described by the bid item name.
4. The corrugation dimension for corrugated steel pipe when other than the standard size corrugation is required.

5. Specific vertical elongation where elliptical shaped steel or aluminum pipes are required, whether the elliptical pipe is specified in the bid item or as an alternate.
6. Procedures or instructions necessary to complete construction of the drainage feature.
7. To indicate locations where features, such as beveled end sections, safety bars, etc., are required.
8. When making a reference in the General Notes to a detail in the contract plans DO NOT use the statement "FOR DETAIL SEE PLANS". Identify the exact plan sheet (using the Plan Reference No.) where the detail is located.
9. When making a reference to the Standard Plans, give the full Standard Plan number.
10. When making a reference in the General Notes to a special provision in the contract, DO NOT use the statement "SEE SPECIAL PROVISIONS". Identify the special provision exactly by name.

The bid item totals on the Structure Note sheets must be consistent with the bid item totals entered in the Estimate.

If the quantities for an item appear on other plan sheets, in addition to the structure note sheets, cross-references shall be made to the sheets where the additional quantities can be found.

460.13 Drainage Plan

- See [Example 4-22](#).

Each plan sheet will have its own consecutive series of numbers identifying drainage features (numbers beginning with number 1 enclosed in circles) beginning in the top left corner of the sheet and progressing across and down the

sheet. A light, arrowless line will be drawn from the circle to the drainage feature or features. These numbers relate directly back to the Structure Notes plan sheets.

When a drainage feature is continued on more than one sheet, the circle will be divided with a horizontal line, and the plan sheet reference number on which the drainage feature first appears will be inserted in the upper half and the individual identifying number will be inserted in the lower half. A larger scale circle may be used if this is done. The circle symbol is reserved for the purpose of identifying drainage features and is not to be used for any other purpose.

If a sanitary or storm sewer line stationing is used, the plan sheets will indicate the appropriate ties to the construction center line.

Each cross pipe will have a separate code number, which will include any attached drainage structure, and any riprap, quarry spalls, or other end treatment being constructed in conjunction with the pipe.

Each run of pipe in a closed sewer system will have a separate code number which will include the pipe and the drainage structure on the inlet end of the run of pipe.

If multiple pipes are to be placed in the same trench, they may be combined under a single structure code.

The skew angle for all skewed cross pipes shall be indicated on the plan sheets, unless both ends are controlled by station and offset and the stations and offsets appear on the structure note sheet.

A roadway ditch that is shown as part of a roadway section does not need to be shown on the drainage plans. This roadway ditch is included in the earthwork items as part of the bid items for Roadway Excavation Incl. Haul. This roadway ditch shall not be assigned a structure note number. When a ditch is constructed based on a drainage profile in the drainage plans, then this ditch shall be assigned

a structure note number and the excavation is included in the bid item, Ditch Excavation.

460.14 Drainage Profiles

- See [Example 4-23](#).

The established scale controls the drainage profiles vertically. There is usually no horizontal scale for the drainage profiles, but it is recommended that distances represented be drawn proportionately. Each profile will be drawn in proportion horizontally for the length of the profile (the space representing 10 feet will appear the same for the length of the profile, and it will appear to be approximately 2 times a space representing 5 feet).

The profiles can be made visually easier to follow by using an elongated triangle to represent manholes and a elongated rectangle to represent other drainage structures (catch basins, inlets, etc.)

The distance shown between drainage structures is not the length of pipe, but the horizontal distance from center of structure to center of structure. If it happens to appear to be the same as the length of pipe shown in the Structure Notes Plan Sheet it is merely coincidental.

Pipe diameters are to be drawn with proportionate scale, so a 12- inch diameter pipe will be drawn half the size of a 24- inch diameter pipe.

The drainage profiles are to be drawn as a straight line representation of the path the water will take as it flows through the system, without regard for the actual plan view direction the pipes are running. The designer does not have to break the profile because a system that had been running parallel to the center line has turned ninety degrees at a catch basin and crossed the roadway.

At locations where two or more pipes bring water to a drainage structure and one pipe carries the water away, there will have to be breaks in the profiles. One profile will continue through the common drainage structure and

show the water leaving the structure, while the other profiles will stop or start at the common structure. There will be a leader line drawn between the representations of the common drainage structure with the note “same catch basin”, which is the tie between the profiles and completes each without having to draw the exit pipe a number of times. The information for the common structure will only be shown on one profile, usually the one that shows the outlet pipe.

The following information is to appear on the drainage profiles:

1. Inlet and outlet flow line elevations of pipes (shown below the pipe profile).
2. Outflow treatments such as riprap, quarry spalls, and, if the ditch is other than a roadway or median ditch, ditch profiles.
3. Debris deflectors, standpipes and headwalls.
4. The type of drainage structure, and station and offset location of the structure (shown above the structure).
5. The rim elevation of manholes, catch basins, inlets, or other drainage structures (shown above the structure).
6. The horizontal distance between adjacent drainage structures from center of structure to center of structure.
7. The size of pipe in each run (do not have to include the type of pipe).
8. The pipe slope (carried out to sufficient decimal places so that when the calculation is made from the indicated inlet flow line, on the given grade, for the given distance, the result will be the outlet flow line indicated).

9. Finished ground line above the pipe.
10. Original ground line if pipes will be placed prior to embankment construction or if original ground differs from the finished ground line.

460.15 Utility Plan

- See [Example 4-19](#).

When the contractor is to work on the existing utilities as part of the contract, plan sheets for utility structure notes, plans and details will be required. These sheets shall follow the same general guidelines as specified for drainage structure notes, plans, and details.

RCW 19.122.040 (Revised Code of Washington) requires WSDOT to identify and locate known underground utilities in our contracts. The designer should make every effort to identify and locate above ground utilities also. The RCW is as follows:

RCW 19.122.040 Underground facilities identified in bid or contract--Excavator's duty of reasonable care--Liability for damages--Attorneys' fees.

- (1) Project owners shall indicate in bid or contract documents the existence of underground facilities known by the project owner to be located within the proposed area of excavation. The following shall be deemed changed or differing site conditions:
 - (a) An underground facility not identified as required by this chapter or other provision of law; and
 - (b) An underground facility not located, as required by this chapter or other provision of law, by the project owner or excavator if the project

owner or excavator is also a utility.

- (2) An excavator shall use reasonable care to avoid damaging underground facilities. An excavator shall:
 - (a) Determine the precise location of underground facilities which have been marked;
 - (b) Plan the excavation to avoid damage to or minimize interference with underground facilities in and near the excavation area; and
 - (c) Provide such support for underground facilities in and near the construction area, including during backfill operations, as may be reasonably necessary for the protection of such facilities.
- (3) If an underground facility is damaged and such damage is the consequence of the failure to fulfill an obligation under this chapter, the party failing to perform that obligation shall be liable for any damages. Any clause in an excavation contract which attempts to allocate liability, or requires indemnification to shift the economic consequences of liability, different from the provisions of this chapter is against public policy and unenforceable. Nothing in this chapter prevents the parties to an excavation contract from contracting with respect to the allocation of risk for changed or differing site conditions.

- (4) In any action brought under this section, the prevailing party is entitled to reasonable attorneys' fees.

[1984 c 144 § 4.]

Identified utilities are to be shown in the bid or contract documents as stated in the RCW. The site preparation series of plans is where they would normally be shown. See [Section 460.10](#). If the project is in an area with lots of utilities, as well as lots of other topographical features, it may be necessary to separate the utilities on a separate series of plans following the site preparation series. The best available information as to the location of underground and overhead utilities is to be used. [Example 4-19](#) shows how utilities are typically shown on a plan sheet.

Do not forget to include WSDOT utilities, such as traffic signal, illumination, and ITS conduits and fixtures.

The required amount of detail related to utility location is directly proportional to the amount of underground work involved in the contract and the proximity to the utility. A simple paver should require less utility detail than a project with excavation at or near a 24 inch natural gas line or a 96 inch sewer line.

460.16 Interchange Contour Plan

Provides finished ground contours for interchange areas. These plans require the region Landscape Architect's or the Headquarters Landscape Architect's (for Regions without a Landscape Architect) stamp, regardless of whether they are prepared by the design office or the landscape section. See Chapter 1310 of the Design Manual.

460.17 Paving/Pavement Marking Plan

- See [Examples 4-24, 4-25, 4-26, 4-27, and 4-28](#).

Paving and pavement marking information will normally be combined on a single series of plans.

If the project requires the paving information to be separate from the pavement marking information, the paving plan will show the total roadway and shoulder widths described by the roadway sections, not lane widths. The pavement marking plans will show the lane configuration and widths. The information is not to be repeated on both series of plans.

The paving/pavement marking plan series is required when the work cannot be shown adequately on the roadway sections. If the roadway sections adequately describe most of the project, only the areas requiring more detailed or specific information need be shown in paving/pavement marking plans.

Pavement marking will conform to the requirements shown in the Design Manual, and the pavement marking applications shown in the Standard Plans. Pavement marking layout information is not required in the plans if the required pavement markings are as shown on the Standard Plans. Pavement marking quantities are to be tabulated on Quantity Tabulation sheets.

When paving/ pavement marking plans are included, they will show all lane and shoulder widths, information on pavement taper lengths and widths, widening for guardrail, as well as the locations of concrete barrier, guardrail, impact attenuators, and traffic islands. The various areas and types of pavement marking will be identified by quantity tabulation note, or, if there is only minor pavement marking, the beginning and ending stations could be shown on the plan for each type in the area.

The only existing information that will appear on the paving/ pavement marking plans will be

the existing roadways and approaches beyond the point where the new construction begins or ends to show the tie between the new and existing. The “old” roadway and lane lines through the construction area are not to be shown.

If there is only minor drainage, signing, or illumination work on the project, this minor work can be shown on the paving/pavement marking plans, provided it does not compromise the clarity of the paving and pavement marking information being shown.

Paving or pavement marking details, such as the layout of a traffic island, may be required at a larger scale to provide sufficient information or required dimensioning to clearly show the construction. These details will follow immediately after the paving/pavement marking series of plans.

460.18 Wetlands, Mitigation Sites and Detention/Retention Site Plans

Wetlands

All wetlands, whether inside of the right of way or not, that *could be* impacted by the construction work shall be shown on the construction plans, using standard symbols.

Wetlands may be either delineated or inventoried. Delineated wetlands will, in most cases, have buffer zones associated with them, which must also be shown on the plans. The buffer zone is established by the local jurisdiction, and may not always be identified on the permit. For each wetland identified within a project area, the designer will have to check with the regional environmental office to get the buffer zone information. Inventoried wetlands have been identified by a visual survey of the area and the required buffer zones are included in the inventoried boundaries.

The wetland and buffer zone shown on the plans is to represent the area, but does not have to be plotted point for point from the delineation information in the permit. The station and offset information required to delineate the site is not

to be included in the contract plans. When the wetland is being surveyed, the information is to be taken directly from the permit.

The wetlands are to be shown on the vicinity map and all other plan sheets, such as those showing cut/fill lines, drainage, or other features that could impact them.

Mitigation Sites

A wetland mitigation site is a wetland area which has been, or is being created, restored, enhanced, or preserved to compensate for wetlands impacted by construction.

All wetland mitigation sites shall be shown on the construction plans, and identified as either “existing” or “to be constructed”. A mitigation site, whether existing or to be constructed, is always identified as a mitigation site on plan sheets. Mitigation sites do not get re-classified as a wetland at a future time.

If a contractor is allowed to work within an existing wetland, wetland buffer zone, or, in rare circumstances, a mitigation site, the allowable work area shall be delineated by the cut and fill line. The contractor shall possess a permit identifying each wetland in which work is allowed.

Retention/Detention Sites

All facilities related to the detention, retention, and treatment, filtration, or drainage of stormwater or surface water, whether existing or to be constructed shall be shown on the construction plans and labeled as Stormwater Treatment Areas. It is important to identify stormwater treatment areas so they will not be misconstrued to be wetlands or mitigation areas in the future.

460.19 Plan Detail Sheet

Details, specific to the project being developed, will have to be provided by the designer to ensure the contractor has a clear picture of the work that is to be performed.

The plan details are to be organized on plan sheets so that they are grouped according to plan series. The detail sheets will then be placed as the last set of plans in the plan series. For example, all of the drainage details will be grouped on the appropriate number of sheets, and will become the last sheets in the drainage plan series (normally following the drainage profiles).

It is important the details be complete, meaningful, and necessary. It is also important that details be drawn at a scale that will clearly show the information when reduced and placed on the 11-inch by 17-inch plan sheets.

Plan details are not to be a redrawn Standard Plan. Many times, however, it is necessary to draw details showing a project specific modification to a Standard Plan. In these instances, sufficient detail is to be provided to indicate the modification, but all of the information on the Standard Plan that is still applicable is not to be redrawn. Instead, a note stating "FOR INFORMATION NOT SHOWN, SEE STANDARD PLAN X-XX" is to be included on the detail.

Details that are not associated with a Standard Plan must be complete, because the contractor is only obligated to provide what is shown on the detail.

Division 5 contains the STATE.CEL library, which is a number of generic or standard details, found in the CADD system. Many of these details can be used as is, or may be modified to fit requirements for a specific application. Use of these details can save both the designer and the CADD operator considerable time over developing and inputting details from scratch.

460.20 Minor Structures (non-structural retaining walls, etc.)

Projects with quantities for minor structures such as non-structural retaining walls (Standard Specification Section 8-24) or other like items of work shall have these quantities shown in the plans in one of the two methods as follows:

1. Quantities shall be shown on Quantity Tabulation Plan sheet(s).
2. Quantities shall be shown in tabular form (in data boxes) on the individual structure plan sheet(s).

460.21 Illumination Plan

- See [Example 4-29](#).

The design of the illumination systems will conform to the guidelines in the Design Manual.

If the illumination work is minor adjustments to an existing system, or the installation of a small system (one or two luminaires) at an intersection, it can many times be shown on another series of plans.

The following information is required for illumination plans:

1. The location of light standards (new and existing).
2. The light standard number for new luminaires.
3. The location of the power source (whether new or existing).
4. The layout of the conduit and electrical circuitry.
5. The mounting height for new luminaires (for existing if being relocated).
6. The mast arm length for new luminaries (for existing if being relocated).
7. Base requirements, fixed or slip, for new luminaires (for existing if being relocated).
8. Conduit size and fill for new installation (for existing affected by, or affecting, the project).

9. Service cabinet requirements for new (or modifications to existing).
10. Junction box locations and types for new (for existing affected by, or affecting, the project) .
11. Luminaire light source, distribution, and voltage for new luminaires.
12. All other features peculiar to the specific project.

Stationing and offsets, shown in the foundation schedule for light standard locations, are to be reasonably accurate to ensure that the design light levels are achieved.

460.22 Traffic Signal Plan

Traffic signal plans are normally provided by either the region traffic office, or the Headquarters Traffic Design Office, and the designer simply incorporates them into the project. The traffic signal plans will follow the guidelines in the Design Manual.

460.23 Intelligent Transportation System Plan

The region traffic office normally provides intelligent transportation systems (ITS) plans, and the designer simply incorporates them into the project. The ITS plans will follow the guidelines in the Design Manual.

Even though the designer is not responsible for the design of the intelligent transportation system, the designer is responsible for providing the appropriate base maps to the traffic design office. The base map information provided to the traffic designer will show the locations of all new and existing features, such as utilities, drainage pipes and structures, so that these features can be taken into account during the initial design. It is also the designers' responsibility to keep the traffic designer aware of all design revisions made to the plans from the time that the initial layout was given to the traffic designer.

460.24 Sign Specification Sheet

- See [Examples 4-30, 4-31 and 4-32](#).

Sign specification sheets are to be prepared on 11-inch by 17-inch paper sheets plotted from CADD or an Excel program.

A separate sign specification sheet will normally be prepared for the installation of new signs, the removal of signs, and the relocation of signs. If the signing work is minor, it is permissible to combine the different types of work on a single sheet, but there should be a distinct, identifiable section of the sheet for each type of work presented.

There will be a separate plan sign numbering system for each of the three types of signing work, and each will be continuous from the beginning of the project to the end.

The sign specification sheets are to be completely filled out.

Remember that the material stock used for the signs comes in 48 inch by 96 inch sheets, so sign sizes need to be adjusted to make the most efficient use of the stock material, the following guidelines should be used:

1. For signs having a horizontal dimension of 48 inches or less, all dimensions shall be specified in inches.
2. For signs having a horizontal dimension of greater than 48 inches, all dimensions shall be specified in feet and inches.

Wood posts can be called out as 4 x 4, 4 x 6, etc., as long as there is no reference to inches. Calling for a 4 x 4 is using the common name for a piece of lumber that is 3-1/2" x 3-1/2".

When a sign installation requires multiple steel posts, the designer will have to specify which base type found on Standard Plan G-8a, Type 1,

2A or 2B, is required for each multiple post installation.

460.25 Signing Plan

- See [Examples 4-33 and 4-34](#).

The signing plans will follow the guidelines included in the Design Manual.

Signing will always be shown in a plan view; however, the designer needs to assess the need for the signing plan series. In many cases, there are not sufficient signs to require a separate series of plans and the signing information can be combined with another series, such as the paving/pavement marking plan series, without affecting the clarity of the overall plan.

A great deal of roadway detail is not normally required for a signing plan. The center line and edge of the roadway is normally all that is required for two lane highways. For multi-lane highways, additional detail and roadway information may be required.

For region-wide signing projects, where an extensive area is covered, a smaller scale, even a strip map, can be used for directional sign placements. However, even in these instances, larger scale details may be required to show sign installations at intersections and other areas where there are numerous signs being installed in a small area.

There is never to be a light standard within 50 feet of the front of an overhead sign installation.

Signs will be located on the plans and identified using the plan sign number. For new installations, the plan sign number will be enclosed in an oval. The plan sign number for sign removals will be enclosed in a rectangle and the number will be preceded by “R-”. Sign relocations will show both the original and relocated locations of the sign and the plan sign number will be enclosed in a square. There will be a leader line from the plan sign number to the sign location. Sign relocations will have two leader lines: a dashed line from the plan sign number to the original location and a solid line

from the plan sign number to the relocated location.

The signing plans will show the following:

1. Construction center lines (all that’s required for destination and speed limit type signing.)
2. Basic roadway layout in areas where detail is required, such as intersections with considerable signing.
3. Sign locations.
4. Small scale layout of directional and special signs, showing required details, such as where upper and lower case lettering is to be used, location of directional arrows, etc. (details may be placed on a separate sheet to avoid overcrowding of the plan).
5. Small scale layout of standard control signs may be shown on the plans (this can be very helpful to both the contractor and the inspector).
6. The plan sign number with leader line pointing to sign location.
7. The WSDOT Sign Fabrication code number adjacent to plan sign number.
8. Signs to be installed.
9. Signs to be removed.
10. Signs to be relocated (show both the original, using a dashed leader line, and relocated, using a solid leader line, locations for the sign).
11. Power source for all illuminated signs (if the source is coincidental to an illumination or traffic signal system and shown on those plans, a construction note referencing the sheet where the source is identified will suffice).

460.26 Signing Details

When overhead signs are being installed on a sign bridge or cantilever structure, the Sign Specification and/or the Sign Detail needs to show the following information:

1. Simple drawing of the new structure and signs.
2. Distance between signs.
3. Distance between signs and end supports or posts.
4. Location of overhead signs in relation to lanes.
5. Sign light spacing.
6. Maintenance walkway position.
7. Other data called for on the plans.

460.27 Bridge Plan

Bridge plans are prepared by the Headquarters Bridge and Structures Office. The designer may be required to provide field information for use by the Headquarters Bridge and Structures Office during the design. Required data and guidelines are shown in the Design Manual.

Most projects with bridge construction will have items of work required because of the bridge work, but are indicated on the bridge plans as “not included in bridge quantities”. The designer is to provide the required PS&E information for these items.

Following is a list of the types of items that are typically “not included in bridge quantities”:

- 1 Drains.
- 2 Gravel backfill for drain.
- 3 Gravel backfill for wall.
- 4 Underdrain pipe behind or around abutments or walls.
- 5 Drain pipe in embankments at bridge ends.

- 6 Utility conduits and anchorage.
- 7 Slope protection.
- 8 Concrete barrier.
- 9 Guardrail connections.

The bridge designer will provide the designer with a list of the items that are not included in the bridge work.

460.28 Traffic Control Plan

As required in the Federal Aid Policy Guide, Title 23 CFR, Chapter 1, Subchapter G Part 630, Subpart J, Section 630.1010(2), every project shall have project specific traffic control plans. “Traffic Control Plans” is the common name for site specific work zone traffic control plans. Primary consideration should be given to worker safety within the work zone while, at the same time, providing for the safe and efficient passage of traffic.

It is important for the designer of the traffic control plans to remember that when the contractor uses the traffic control layouts shown in the plans, WSDOT is in a high liability position should anything go wrong when the traffic control called for is in place. Because of the high liability, this portion of the plan needs to be developed with a great deal of thought, by someone with an understanding of the project, in addition to an understanding of traffic control requirements.

The size and color of all traffic control signs are to be shown on the plan. Warning (W series) signs are, required by WSDOT policy, to be a minimum of 48 inches by 48 inches, but this information still has to be on the plan. Traffic control signing is laid out in respect to the distance from the work area. These distances, from the work area and between signs, are to be shown as plus/minus distances. For example, if the required spacing between signs is 150 feet, it will appear on the plan sheet as 150’+/- . This does not mean the contractor can put the sign any place they want in the 150 footRange, it means the sign is to be placed at 150 feet, unless there is an engineering reason to move it slightly. See the Design Manual, Chapter 810,

for additional items to be included in these plans.

Tables have been developed for sign spacing, taper lengths, pavement marking device spacing, and buffer zone data, that establish criteria for a variety of speeds. It is recommended that these tables be utilized for consistency and to eliminate the possibility of errors in calculations.

The special provisions may allow the contractor to develop traffic control plans or revise those furnished, but, in either case, they cannot be used without approval of the Engineer.

Traffic control plans may contain certain required items, not supplied by WSDOT, for which bid items will be provided for in the project. The traffic control plans shall be reviewed to ensure that all items required for traffic control and bidding are shown as either separate bid items or included in bid items for a lump sum bid if approved by the proper delegated authority.

When the traffic control plans are prepared by the traffic office, the designer must work closely with the traffic office to ensure that the traffic control plans are compatible with the rest of the project and project staging. The traffic office, in many cases, is not as familiar with the entire project as the designer, so the designer should review the traffic control plans thoroughly.

510 General

All plans for contracts, Sundry Sites, Reclamation, and photogrammetric mapping are created using the following established drafting standards. These standards apply to manually drafted plans and those prepared on Computer Aided Drafting and Design (CADD) equipment. Adherence to these standards is essential to ensure the uniformity of plans produced throughout the state.

520 Standards and Symbols

Division 5 (*Standard Symbols and Conventions*) includes the lines, patterns, and the symbols, commonly used in drafting plans. Division 5 also lists CADD cell names, the CADD line weight, CADD line code, CADD level, and CADD line color where applicable. The various geometric and design features that make up plans have been assigned to the 63 different CADD levels. Division 5 is arranged in level order, where all items are listed under the applicable level. These symbols and conventions are available to the CADD operator in the WAESTATE.CEL library.

CADD font 50 will be used for all text on PS&E plans, photogrammetric maps prepared on CADD with the exception that font 42 will be used where a shadow template would normally be used. An exception to the use of font 50 would be for small areas of a plan, i.e., roadway width text, distance ties, etc., where font 50 would be too large. Font 2 shall be used in these cases.

530 WAESTATE.CEL Library (CADD)

The most commonly used symbols, notes, legends, and patterns for CADD plan preparation are contained in the WAESTATE.CEL library. These conventions are located on specific CADD LEVELS.

The current WSDOT CADD workspace is set up so that the libraries will attach as the user logs into the system, they will always have the current library and all the changes as long as they use this configuration.

540 WAEDETAILS.CEL Library (CADD)

Commonly used details, which have been reviewed for compliance with department standards are contained in this library. The details have been drafted in a generic form and queued with question marks. The queues are to be edited using the information that fits the specific project design. These details may also be modified by the user to fit conditions not covered by the details in this library. Examples of details in the WAEDETAIL.CEL library are shown in Division 5-2 and CADD operators should become familiar with the details available.

550 Revision Process to CADD Standard/Procedures

This revision process provides the opportunity for department-wide participation in the development, review, and implementation of new procedures and standards to be used in plan preparation. This process may also be used to improve or revise existing procedures and standards.

This division outlines this process in the form of a flow diagram, prior to symbol listing. Once an idea has been developed to the satisfaction of the originator's work unit (e.g., region plans office, etc.), this process is used to share the idea statewide and implement it as a standard procedure. All changes and revisions MUST still be approved through Headquarters CAE and Headquarters Project Development.

The Headquarters CAE and Headquarters Project Development manage the contents of the WAESTATE.CEL, WAMSTATE.CEL, WAEDetail.CEL and WAMDetail.CEL libraries. Any questions concerning its contents, suggested changes, or additions should be addressed through the Headquarters CAE and to the Headquarters Project Development Office. Although this division specifically references CADD, this procedure may be used to share other ideas relating to plan preparation.

560 Design File Guidelines for CADD Operators

560.01 General

This chapter specifically addresses the CADD standards and procedures used to prepare the contract, sundry site, and PS&E. Plans should be representative of those shown in this manual. Drafting should be neat and clear so there is no question as to the presentation. A review of half-size sheets is recommended to find drafting flaws (a contractor reads contract plans at this size). Common drafting problems found are: text placed on top of other text, text placed on top of lines, leader lines that cross (not definitive), and lines that extend beyond match lines.

560.02 Creating a New File Name

Design files have the extension of .DGN, cell libraries have .CEL extensions.

Seed File

The seed file used by WSDOT for creating new design files contains the working units, global origin, and attributes required for department plans. The seed file used to create new design files is ESEED.DGN.

Working Units

The MicroStation working units for WSDOT V8 PS&E and Right of Way CADD files are to include the following working units parameters:

Master Units:	FT
Sub Units:	TH
Sub Units per Master Unit:	1000
Positional Units per Sub Unit:	1
Working Area	1,705,908,950 miles square

The global origin is located at the lower left corner of the design plane (GO=0,0), where XY=0,0. The graphic elements can be placed accurately to the nearest 1/1000th of a foot respectively.

560.03 File Documentation

Why Have It

No one likes having to “fill out the paperwork,” but without it, no one other than the creator of the file would have any idea of how the file was constructed or how it related to any other files. Each design file should have a file documentation sheet, located in Plot Location 30, to be filled out at the creation of a new file. It is the responsibility of the user creating this new file to initially fill out the sheet. Furthermore, it is the responsibility of each CADD user who modifies the file in any way to update the file documentation.

560.04 Levels

What They Are

Levels are like “clear overlays” (see Figure 1). Each design file contains 63 levels each overlaying the other. They are assigned named Level 1 through named Level 63. All of the design information is put on different levels.



Figure 1

Information such as proposed highway alignment is drawn on level 28, proposed utilities on level 40 and proposed guardrail on level 42. The operator can produce different types of plans by turning these levels on and off, just like placing different clear overlays together (see example in Figure 2).

Levels for R/W Plan Sheet

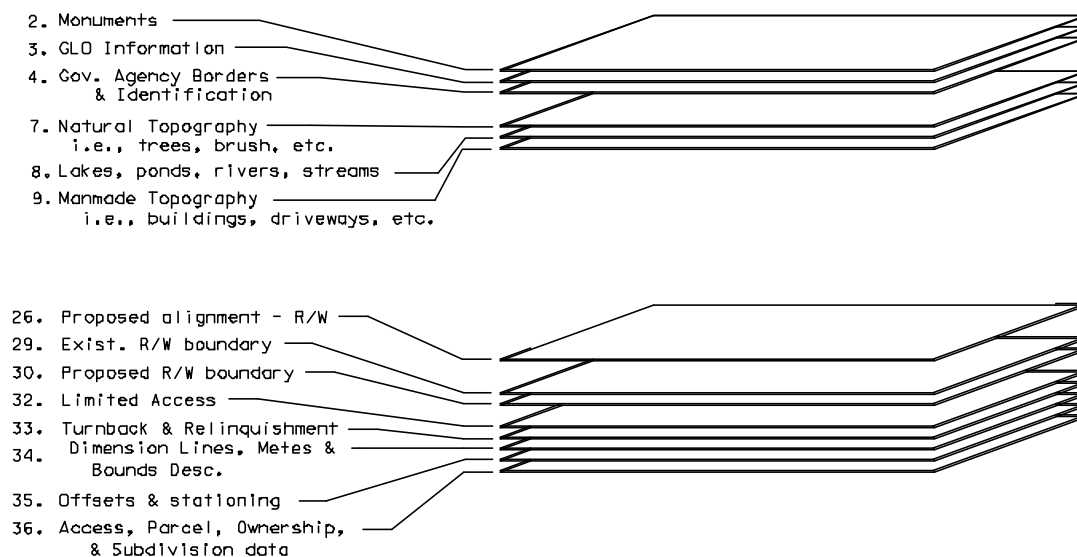


Figure 2

Use of Unassigned Levels

Occasionally, data must be placed on a level other than those listed in the *Plans Preparation Manual*, Standard Symbols and Conventions. There are a few unassigned levels for this purpose. The operator must make sure that no other information will be in conflict when using these levels.

An example of this would be if the operator needed to break out an intersection from the rest of the alignment to be plotted at a greater scale, and that the line styles, text, and cells were too large to work around. The operator could then assign a copy of these cells, line styles, and text on this breakout at a different scale using an unassigned level. Once placed, the levels of information which were too large could then be turned off.

Setting the Plotting Scale

Before placing data in the newly created design file, the operator must first set the plotting scale to the standard scale of 1"=100' on an 11"x17" sheet. This is done using the WSDOT menu, and selecting **Scale**. The operator then picks the appropriate plotting scale. VB applications use this scale factor when placing some text, cells, and patterns. Not more than one scale factor should be used in any one design file. To maintain compatibility with older files the operator may set the scale to match that of the older files.

560.05 What Goes Where

Sheet Borders

Sheet borders are placed in the design file by use of the **Place Sheet** command selected from the WSDOT **Sheet Items** menu. This command places plan sheets in a reserved area of the design file. A description of this area in coordinate terms would be: (XY=100000,100000 and XY=111150,129075). An automatic plotting macro on the sheet dialog box called **Plot Sheets** recognizes this reserved area and looks there for the requested sheets to plot.

Data for Sheets Only

Data placed directly on the plan sheet should be that which relates to the sheet border alone. Information such as match lines, curve data blocks, scale bars, notes, datum symbols, etc., should be placed within the sheet borders. To further aid in this process, the WSDOT menu has a menu for Base Map items and Sheet file items.

560.06 Reference Files

Reference File Data

Data that relates to the alignment, right of way, etc., should be placed at actual ground coordinates in a design file. All information should be placed where it belongs by coordinates and on the appropriate level.

Fonts/Text

Text is placed in a design file with different fonts or style of text. Standard fonts for use in preparing PS&E and right of way plans are 2, 42, and 50. All others are not standard. It may be necessary to use non-standard fonts to maintain the formatting of information imported from other applications. For example an imported Excel spreadsheet may require certain True Type fonts in order to appear correctly.

Font 50 is to be used for most information. **Font 2** is to be used only in places where font 50 cannot fit (e.g., dimensioning the width of roadway). Most often Font 2 will fit better.

Font 42 is used for names of cities, towns, interchanges, and subdivisions, waterways. Sometimes, other fonts come into the design file from foreign sources. Cartography uses special fonts when preparing Quad Maps. We use these Quad Maps in preparing Vicinity Maps. Even though the fonts are not the same as our standards, there is no need to change them just for a Vicinity Map as long as their appearance is acceptable.

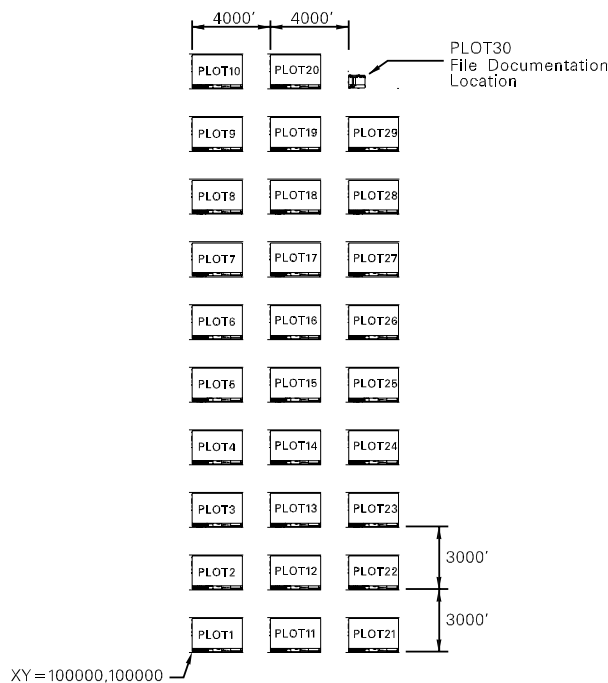
The table below shows the relationship between the plotted size of the text and the size of the text when measured in MicroStation at the sheet location.

ENGLISH	
<u>inches</u>	<u>feet</u>
.05	10
.06	12
.07	14
.09	18
.10	20
.125	25
.175	35

The rule of thumb is that text plotted at (English .05 and .06) must be all capital letters so the contract plans can be read easily. Text plotted at (English .07 or greater) can be upper and lower case letters. Using upper and lower case letters can be of benefit, especially when all capital letters can be used to emphasize something.

Placing Plan Sheets

Figure 3 shows the position of each sheet within the plan sheet placement area. The automated plotting program plots sheets from this reserved area. PLOT30 is reserved in every design file for the File Documentation Sheet.

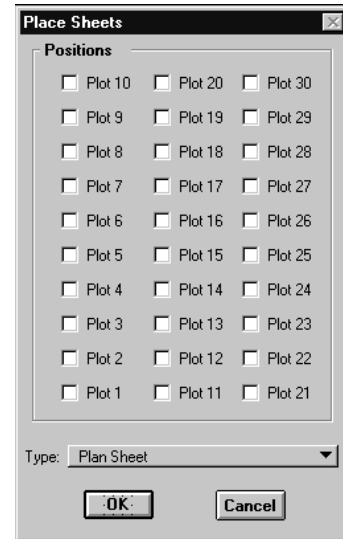


English Figure 3

Sheets are placed in the proper locations with the **Place Sheets** command found on the Sheet dialog box.

This command brings up the Place Sheets dialog box.

The dialog box has a section with check boxes for each standard sheet location, PLOT1 through PLOT30. There is also a pop-up menu which lists all the available plan sheet types. The user should first pick the type of sheet from this menu. Once this is done the locations for this type of sheet may be selected by clicking on the boxes for the desired sheet locations. To unselect a location, click on that box again. To place the sheets click on the **OK** button. The screen will now show each plan being placed. When the sheets are all placed an alert box will ask, “Do you want to place more sheets?” If more sheets or different styles of sheets are needed the user selects **Yes** and the Place Sheets dialog will reappear allowing other sheets to be placed. The user should select **No** to exit the command.



The **Place Sheets** command places the selected sheet cell from the cell library in the correct plot location, places a PLOTx number in the lower right corner of the plan sheet, and saves a view of PLOTx. This is a good time to rename the saved view description to something meaningful, like: PLOT1, R1 Roadway Section.

Saved Views

Saved views are nothing more than saving a “camera” position above the design plane. You can have an infinite number of these cameras, each at different distances from the design plane, and each looking at different levels turned on. You can even rotate the camera for a different rotational view. The view, or “camera” position is then saved using the Saved View dialog box to enter the view name and description.

What is a Reference

A reference is any design file, usually a base plan, which can be attached to the active design file and displayed for reference only and not for modification. A reference attachment can be thought of as a window in the active design file through which portions of the base file can be seen. The entire file may be attached as a “coincidental” reference, which includes the entire design plane. Each coordinate in a coincidental reference, overlays the same coordinate in the active file. Alternatively, and preferably, any saved view stored in the reference may be selected when attaching it to the active design file thus limiting the elements displayed in the reference attachment to those that were visible in the saved view. A reference attachment created from a saved view can be scaled and moved anywhere in the active file as it does not extend to the limits of the design plane.

560.07 Naming Conventions

SAVED View Names

The view name should be pertinent to the type of plan it will be used for, i.e. PAVE01 for a paving plan, Drain01 for a drainage plan and so on. Placing a zero before a single digit will organize the saved views. The description of the saved view should always be the station limits of the plan sheet. Remember, other operators may be using this file at some other time.

Logical Names

Logical names are those given when attaching a reference to a sheet. The purpose of a logical name is to provide a simple and unique name for use in manipulation of the reference attachment. It also allows you to differentiate between multiple attachments from the same file. Figure 4 shows that file B.DGN (The Base Map file) is referenced to file A.DGN (The Sheet file) 5 times, once for each of 5 sheets. Without unique logical names there would be no way to attach B.DGN (the Base Map) multiple times.

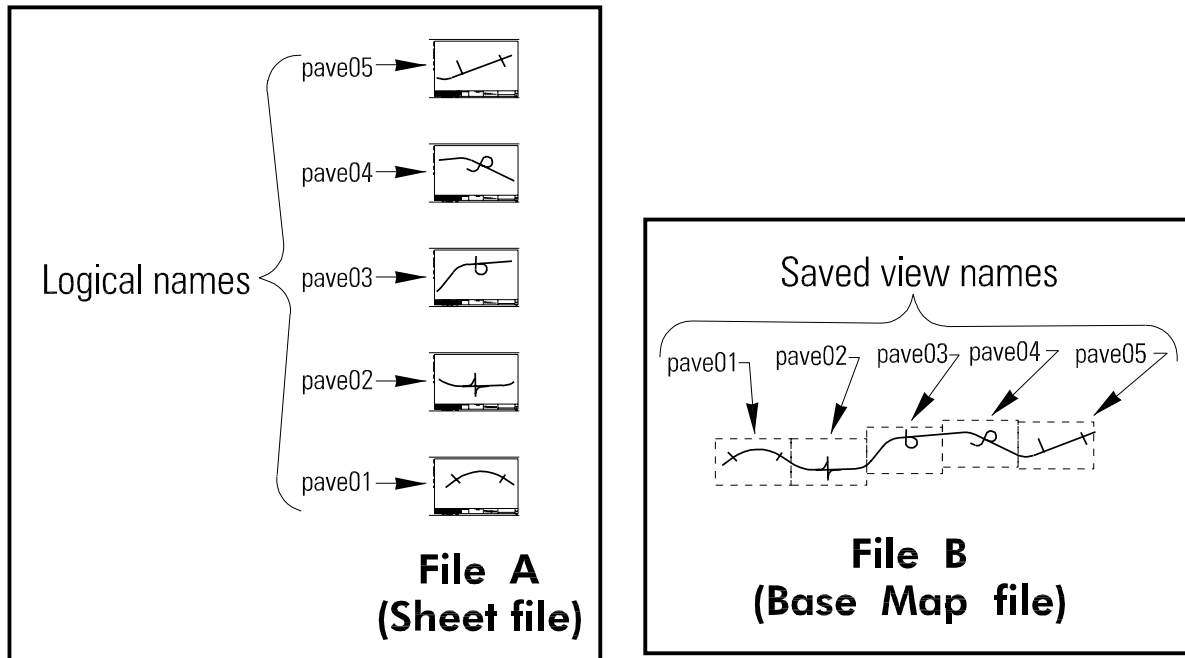


Figure 4

Probably the most important thing to remember about the logical name is to make it the same as the saved view name being used for attachment. If the saved view name is PAVE01 then the logical name should be PAVE01. This makes it easier for the operator to go back and forth between manipulating the reference file on a sheet using the logical name, and going to the reference file, using the saved view name and pulling up the view to manipulate the elements in the reference file.

View Setup

View Rotation

After opening the Base Map file, consider how much the view needs to be rotated. Does the highway run south to north in your design? If so, it must be rotated somewhat to get it to go from left to right across the sheet when attached. Once you have decided how much to rotate the view, rotate it with the Rotate View command.

Note:

All rotation must be done in the base plan saved views. Reference files are **never** rotated.

Saving A View

To save the view for attachment, use the **Saved View** dialog box to enter the view name and description. You have now saved a “camera position” for this view.

Note:

You can set the view back “normal with the world” at any time by selecting the **Rotate View Command > Unrotated**. This returns the view with North being up on the screen.

Attaching

To attach a saved view to a sheet as a reference, bring the desired sheet up on screen. From the **References** toolbox, click on the **Attach Reference** icon. This brings up a dialog box where you can select the file containing the view you wish to attach. Once the file is selected another dialog is displayed which lets you chose the view, set the logical name, add an optional description, and specify the Master: Reference scale factor.

Remember to name the logical the same as the saved view in the reference file.

When you are satisfied with your settings accept them by clicking **OK**. An outline of the saved view which is being referenced will attach to your cursor. Position the outline in the sheet and data point to accept. The reference will now appear. You can use the reference move command to adjust the reference file position on the plan sheet.

The table below gives master: reference scale factors necessary to create plan sheets at the desired sheet scale.

<u>master:ref.</u>	<u>Sheet Scale</u> 11"x17"	<u>Sheet Scale</u> 22"x34"
1:1	1"= 200'	1"= 100'
2:1	1"= 100'	1"= 50'
5:1	1"= 40'	1"= 20'

Reference Levels

The levels turned on in the view saved are those turned on when the view is attached as a reference. If additional levels are required, the operator can turn them on through Level Manager. If additional reference levels are turned on, the operator must go back to the base file, call up the saved view, turn on the additional levels, delete the view, and resave it with the new levels turned on. It is **not necessary** to reattach it to the sheet.

560.08 Clipping

Clip Boundaries

When the view is attached to the sheet, there is usually extra information that is not needed. The clip boundary command trims all of this extra off the sheet. To define a reference clipping boundary (the outside boundary of the displayed area), first place a fence with the **Place Fence** tool. In the list box in the Reference dialog box, select the reference file. From the dialog box's Tools menu, choose **Clip Boundary**. It is best to cut the boundary perpendicular to the roadways at a station that is not marked. The reference file will undraw itself and then redraw itself displaying only the area inside the fence. The limits of the reference file can be expanded in the same way. When expanding the limits it is usually a good idea to place a fence around a much larger area. Fence the desired area and reclip it using the reference file clip boundary command. The reference file clipping limits can be viewed by turning on **Ref Boundaries** in **View Attributes**.

Sheet Title-Strip Data

Each sheet in a set of plans has a title strip along the bottom border. Information found there includes the contract name, sheet type, sheet reference number, sheet number, total number of sheets, federal aid project number, job number, contract number, design team information and PE stamp.

This information is easily entered through the use of the Place Labels macro on the Sheet dialog box. When invoked, a dialog box with fields for each item is presented to the user. The user fills in the desired fields and the selected sheets are updated.

File (Save Settings)

The **Save Settings** command is located in the **File** menu. It allows the operator to preserve settings in a design file between CADD sessions. Settings affected include view attributes, element attributes, active scale, active angle, locks, view arrangement, coordinate readout, etc. When opening a file, the initial state of these settings is the same as those last set while editing the file. If this is a newly created file the settings are those of the seed file used to create it

570 Bridge Site Data turn-in Procedures

570.01 MicroStation Base Map = Bridge Site Data

These steps will direct an operator through the process of turning in data to the Bridge and Structures Office.

- MicroStation Base map **2d only, no 3d files of any kind**
- All base map levels according to Chapter 5 of this manual. This is important for the Bridge software to read your files.
- All levels turned on.
- All reference files merged in and reference file list empty (so Bridge knows that all of the information is there). Contact your Region Coordinator for this procedure.
- Superimpose all Bridge Site Data
- Run deldup and file fixer
- Provide existing and new alignments in the same file.
- Turn in at a scale of 1:1.
- Fill out the documentation sheet for any things that are different or empty levels.
- No data in Caice form – DGN files only.
- Send Caice Output sheets
- Send hard copies – CHANNELIZATION, PROFILES, SUPERELEVATION DIAGRAMS, STAGING & TYPICAL SECTIONS.
- When working with a consultant; all of the above applies. But if the consultant does not use MicroStation and uses AutoCAD; they are permitted to send Bridge Site Data in AutoCAD format (DWG).

Division 7

Miscellaneous Contract Considerations

710 HMA (Hot Mix Asphalt)

710.01 Anti-Stripping Additive

A bid item for “Anti-Stripping Additive” shall be included in all projects with bituminous surface treatment (BST) using cut-back (not emulsified) asphalts, HMA and asphalt treated base (ATB).

The estimated force account dollar amount for “Anti-Stripping Additive” can be calculated at \$1 per ton of HMA/ATB. Round the total estimated amount to the nearest \$10.

710.02 HMA for Approach

The item “HMA for Approach Cl. ____ PG ____” is to be used when there are road approaches to be paved on the project.

This is not to be confused with county roads and city street intersections. County road and city street intersections shall be included in mainline paving quantities.

In either case, the approaches will be identified by approach sections on the roadway section sheets, and on the paving plans, if they are present, so the contractor is aware of the number, locations and paving requirements.

710.03 HMA for Preleveling

The bid item for “HMA for Preleveling Cl. ____ PG ____” is to be provided when a project requires preleveling of the existing roadway surface.

The quantity of preleveling is to be based on a survey of field conditions. In some regions, this survey may be made by the Materials Laboratory and they may provide the prelevel rate or quantity.

710.04 HMA Quality Assurance

As an incentive for contractors to provide superior quality HMA, WSDOT pays a 3% bonus for providing consistent materials and a 2% bonus for compaction effort.

When a project calls for paving with HMA, the item “Job Mix Compliance Price Adjustment” (JMCPA) will be required if the following condition exists:

If the total tonnage for a class of HMA accepted by statistical evaluation is greater than 2500-tons.

The price adjustment will be calculated using the following formula:

$$\text{JMCPA} = (0.03) (\text{TEC})$$

where:

TEC = Summation of the Total Estimated Cost of each class of HMA greater than 2500 tons, with the exception that HMA accepted by commercial evaluation (standard specification 5-04.3(8)A item 1) is not included in the calculation.

Example:

Description	Quantity	Unit Price	Est. Cost
-------------	----------	------------	-----------

HMA Cl.			
1/2 IN. PG_	2400	\$40.00	\$96,000
HMA Cl.			
1/2 IN. PG_	1500	\$35.00	N/A
(prelevel)			
HMA Cl.			
3/8 IN. PG_	1100	\$42.00	N/A

Summation of Total Est. Costs	
(TEC) =	\$96,000

$$\text{JMCPA} = (0.03)(\$96,000)$$

$$\text{JMCPA} = \$2,880$$

Use \$2,900 for “Job Mix Compliance Price Adjustment”

When a project calls for paving with HMA, the item “Compaction Price Adjustment” (CPA) will be required, regardless of the tonnage, if the total compacted depth for a class of HMA placed in the traffic lanes is greater than 0.10’.

The price adjustment will be calculated using the following formula:

$$CPA = (0.02) (TWTEC)$$

where:

TWTEC = Travel Way Total Estimated Cost of HMA with a total depth of 0.10’ or greater.

Note: If the same compaction effort is required on the shoulders, the shoulders will be included in the calculations for “Compaction Price Adjustment”. For instance, if the shoulders were being constructed full depth at this time because they will become a driving lane in the future, or if shoulder driving is going to be allowed. There would also have to be a Special Provision written specifying the same compaction effort is required on the shoulders as the traveled way.

Example:

HMA CL 1/2 IN. PG_:
Length: 500’
Width: 2 lanes @ 12’ and 2 shoulders @ 10.0’
Depth: 1 lift @ 0.20’ depth
Unit Price: \$40/ton
Conversion factor: 2.05 t/cy

$$TWTEC = \frac{(500')(24')(0.20')(2.05t/cy)(\$40/ton)}{(27ft^3/cy)}$$

$$TWTEC = \$7,288.89$$

HMA CL 1/2 IN. PG_:

Length: 300’
Width: 2 lanes @ 12’ and 2 shoulders @ 4’
Depth: 1 lift @ 0.15’ depth
Unit Price: \$42/ton

$$TWTEC = \frac{(300')(24')(0.15')(2.05t/cy)(\$42/ton)}{(27ft^3/cy)}$$

$$TWTEC = \$3,444.00$$

$$\text{Travel Way Total Est. Cost (TWTEC)} = \$10,732.89$$

$$CPA = (0.02)(\$10,732.89) = \$214.66$$

Use \$220 for “Compaction Price Adjustment”

710.05 Asphalt for Fog Seal

The item “Asphalt for Fog Seal” is normally associated with bituminous surface treatment (BST) projects, the shoulders of paving projects that only place HMA in the traffic lanes, and is required on all open graded HMA projects as well.

710.06 Soil Residual Herbicide

There are no criteria established for when soil residual herbicide is to be used in conjunction with HMA, asphalt concrete sidewalks, bike paths, or parking lots. The designer is to check with the maintenance supervisor responsible for the area for a recommendation whether or not soil residual herbicide is required.

720 Earthwork

720.01 Aeration

If it is found necessary or desirable to include the bid item “Aeration” in a project, approval by the Headquarters Construction Office is required. A copy of this written approval is to be included in the PS&E portion of the project file.

720.02 Borrow Material

Because WSDOT is committed to conserving valuable mineral resources, it is imperative that careful consideration be given to the earthwork portion of every project, to ensure the most

efficient and cost effective use of the material from the roadway excavations.

If there is insufficient roadway excavation material, due to a shortage of onsite material, or because all, or a portion of the onsite material is known to be unacceptable for constructing embankments, material will have to be imported, and a borrow item will be included in the project.

If the borrow is required because the roadway excavation material is not acceptable for embankment construction, the Special Provisions shall identify the locations of the unacceptable roadway excavation material.

If a single type of borrow material is required to supplement the quantity of roadway excavation material, it will be the contractor's responsibility to determine the most efficient means of using the onsite material and the borrow to construct the embankments. The borrow quantities will appear only on the summary of quantities, not on the quantity arrows on the profiles. Then the borrow material can be placed by the contractor in the locations determined by the contractor to be the most efficient and cost effective for their operation.

If the borrow material is being used only at specific, well defined locations on the project (bridge end embankments, for example), the exact locations are to be identified on the profile by showing the quantity arrow, indicating the station to station limits and quantity for the embankment constructed from the borrow material. If profiles are not included in the project, the Special Provisions are to contain a statement such as, "Gravel borrow shall be used to construct the bridge end embankments, L X+XX to L X+XX".

If two or more types of borrow material are required, the specific locations for all but one of the types of borrow shall be identified on the profiles, or in the Special Provisions, as described above.

For example:

If gravel borrow is required for the construction of bridge end embankments, and common borrow is required to supplement the roadway excavation material to construct other embankments, the station-to-station limits of the gravel borrow material are to be shown on the profiles, or the Special Provisions. It will remain the contractors responsibility to determine the most efficient and cost effective way to use the common borrow and the roadway excavation material to construct the remaining embankments, so the common borrow quantity will only appear on the summary of quantities.

In all cases, the quantities for roadway excavation and embankment shall appear on the summary of quantities and on the roadway profiles, or, on smaller projects, be tabulated on quantity tabulation sheets.

720.03 Clearing and Grubbing

For estimating purposes, clearing is to be calculated as being performed 10 feet, and grubbing 7 feet, beyond the toe of slope for embankments and the upper limit of slope treatment in cuts.

If clearing requires the cutting of merchantable timber, amounting to at least one log truck load (approximately 5000 board feet), from within the right of way, the GSP for Timber Export Restrictions is to be included in the Contract Provisions. This GSP notifies the contractor that they will be required to pay to the Department of Revenue the forest excise tax on the harvested lumber.

720.04 Earthwork for Guardrail Terminals

It is important that the designer include the earthwork quantities required to construct guardrail terminals. It is easy to assume that these seemingly minor quantities will have little, if any, impact on the final quantities, so they are often left out of the final quantities.

There have been many projects where the earthwork quantities overran, and the reason for the overrun was because the designer had not included the required earthwork quantities for the construction of guardrail widening areas. As minor as these quantities may seem at the time of design, they can have a big impact on the construction project if not accounted for in the contract.

If, after the final guardrail locations are set, a final earthwork run is not made to account for the earthwork quantity in the flare construction, the following is to be used as an estimate of the quantity to be added into the computer generated earthwork quantity:

1. If the installation requires an SRT, use 10 cubic yards for each foot of embankment height.
2. If the installation requires no flare, use 4 cubic yards for each foot of embankment height.

If the project is basically a paver, with isolated areas of widening for guardrail or slope flattening, and profiles are not required for the paving, the earthwork quantities are to be presented in tabular form for each area, broken down into 3 station totals, or some other logical breakout.

720.05 Embankment In Place

This bid item is to be used on projects where earthwork consists mainly of borrow excavation. It provides payment for acquiring, excavating, hauling, placing, and compacting borrow materials to construct the embankment. The use of this item requires approval by the Headquarters Construction Office.

If there are *minor* quantities of roadway excavation included in the project, this work can be included in the item "Embankment In Place."

Measurement for payment will be by the cubic yard volume between the original ground line and the neat lines of the embankment template.

No allowance is made for subsidence or settlement.

The request to use this item is to contain the following:

1. Assurance that the foundation on which the embankment material is to be placed is unyielding.
2. Estimated quantities for borrow excavation, embankment compaction and roadway excavation.

720.06 Earthwork Measurement

Measurement of earthwork other than as specified in the Standard Specifications requires approval of the Headquarters Construction Office.

720.07 Truck Measurement of Earthwork Quantities

Truck measurement can be utilized on projects with 5000 cubic yards or less of embankment to be constructed, or when the project consists of numerous small embankment areas where cross sectioning is not practical.

720.08 Geotechnical Project Documentation

- ❖ The Region Project Development Office or Terminal Engineering Department for WSF is responsible to notify the Headquarters Geotechnical Services Branch at least 12 to 14 weeks in advance of the Ad or Shelf Date, when the final project geotechnical documentation is due for each pertinent project.
- ❖ When a PS&E is near completion, all of the geotechnical design memorandums and materials source reports are compiled to form the Final Geotechnical Project Documentation, to be published for the use of prospective bidders.
- ❖ The Region Project Development office or Terminal Engineering Department for WSF will identify at that time, who they have

designated to receive, handle and continue the publication process of the report.

- ❖ It is desirable that the final geotechnical documentation be available for printing 10 weeks prior to the Ad or Shelf Date, but absolutely must be available no later than two Fridays prior to the AD or Shelf date.
- ❖ When transmitting the final project geotechnical documentation, the Headquarters Geotechnical Services Branch will explicitly identify the geotechnical documentation as **final** and camera-ready. Likewise, the region materials section will concurrently send a camera-ready **final** copy of region-generated reports, to be included as part of the geotechnical documentation for the project.
- ❖ For Headquarters Ad and Award projects, when the region has received the report, the Region Project Development office sends the complete package to the Headquarters Printing Services for final publication and to be made available to prospective bidders for purchasing. For Washington State Ferries' projects, WSF's Contracts/Legal Services Office is responsible to copy and make the report available to prospective bidders.
- ❖ The Headquarters Contract AD and Award Office will issue a notice indicating the availability of the geotechnical documentation to bidders.
- ❖ In addition, some geotechnical information shall be included as part of the contract and will generally consist of the final project boring logs, and/or a Summary of Geotechnical conditions when applicable. Both of these items are provided by the Headquarters Geotechnical Services Branch.

730 EEO And Training

730.01 DBE or MWBE Goals

Disadvantaged Business Enterprise (DBE) goals (federally funded projects) are Zero

Goals and Minority and Women's Business Enterprise (MWBE) goals (state funded projects) are all voluntary. Construction Administration and the External Civil Rights Office monitor the participation of the goals.

730.02 Training Goals

The bid item for "Training" is to be provided on most federal aid projects. The training goals, in terms of the total number of training hours required, are established by the Headquarters External Civil Rights Office. The region may submit a training recommendation for consideration by the External Civil Rights Office.

740 Material Sources

740.01 Aggregate Stockpiles

The regions are authorized to spend M5 funds for acquisition of aggregates, under the construction contract, provided the region's biennial M5 allocation is not exceeded.

The following Headquarter offices need to be advised by the region of all M5 aggregate stockpile acquisitions made under a construction contract:

1. Administrative Services Office — Purchasing and Inventory Branch.
2. Comptroller's Office — Budget Management Branch.
3. Program Management Office — Programs Manager.
4. Pre-Contract Administration Office.

740.02 Amortization of Materials and Stockpile Sites

If a state source of materials is provided, the project report form is to include the dollar amount to be amortized, providing the region intends that amortization be included in the project.

The estimate will include the dollar amount so that federal aid participation can be obtained on federal aid projects, or so that proper accounting procedures can be followed when state funds only are involved.

740.03 Materials Sources and Waste Sites

Material sources provided by the contracting agency can be either mandatory or non-mandatory sites.

When mandatory material sources or waste sites are specified, the region shall provide a memorandum of justification, in accordance with FHPM 64116 CFR23 Volume 1 Section 635.407, showing a definite finding that it is in the public's best interest to require the use of the mandatory sites furnished or designated by the contracting agency. The use of mandatory sites can also be designated based on environmental considerations, provided the environment would be substantially enhanced without excessive cost. The memorandum of justification is to be placed in the PS&E portion of the project file. The contractor is required to use the mandatory site.

When non-mandatory sites are specified, the contracting agency makes the site available to the contractor, but the contractor has the option to use, or not use, the site.

Bid items for work to be performed within a non-mandatory site are to be site specific ("Wire Fence Type 1 – QS-X-XX"). This allows the contractor the opportunity to bid zero for these site-specific items if they do not intend to use the site. If the contractor decides later to use the site, the work specified by the site specific items will be performed, and the contractor will be paid at the bid amount of \$0.00.

Site-specific items are not required for work to be performed in mandatory sites.

A separate column, under the appropriate group, is to be set up for each material source or waste site provided by the contracting agency. This allows the contractor to easily identify the work to be performed within a site, and also allows for easy accounting of the work by WSDOT.

The region shall prepare a haul road agreement if the haul route to or from the site is other than a state highway.

750 Other Contract Considerations

750.01 Addenda

Addenda are revisions to the plans and contract provisions that are made during the advertising period. Addenda are only to be issued when the revision will affect the contractors' ability to provide a responsible bid.

If there are material specification changes, new items, a substantial quantity revision (generally a 25% or greater increase or decrease) for an existing item, or a revision to a legal requirement in the contract, an addendum would be required. All of these would affect the contractor's bid.

Small adjustments to quantities, spelling, punctuation, design changes that do not affect quantity, and relocating items of work within the project will not normally require an addendum, because they will not affect the way the contractor bids the project. These items are not to be ignored, but the information, in the form of revised plan sheets, need only be passed along to the office of the construction project engineer, so they can be incorporated into the project and given to the contractor that is awarded the project.

For example:

The advertised project has 23 catch basins to be installed, and it is discovered that an additional catch basin, not shown on the plans, will be required. This would not warrant an addendum if this was the only

change being made. The small change in quantity will not impact the contractor's bid. This can be handled under construction as any other increase in quantity.

Now let's say that the addition of the one catch basin causes the 18" diameter pipe item to increase from 985 feet to 1250 feet. This increase in pipe length is greater than 125% of the original, which could cause this item to be renegotiated under the contract, so the addendum would be justified. Since the addendum is required for the pipe, the additional catch basin would also be included in the addendum.

[Appendix 5](#) has instructions and procedures for preparing Addenda.

750.02 Agreements

A conscientious effort shall be made to insure that all agreements necessary for the project are complete and signed prior to the project going to Ad. If this cannot be accomplished, it is the responsibility of the region to determine the risk involved in going to Ad without the completed agreement, in accordance with the Ad and Award Manual (M2-02). Particular attention is to be paid to the following:

1. The quantities, bid item names, units of measurement, and prices in the agreement are to be the same as those in the PS&E.
2. A local agency or utility may be financially responsible for some of the work in WSDOT's contract. This work may be the construction of sidewalks, utility installations, signal systems, pavement markings, intersection improvements, etc.

Some participating agreements will contain an "out clause", which allows the outside agency to withdraw the work if the bid prices are not favorable. When an "out clause" is included in the agreement, there is a GSP titled "Award Of

Contract" that needs to be included in the Contract Provisions.

When preparing the estimate of cost for an agreement for work under the contract that is the financial responsibility of an outside agency, mobilization, engineering, and contingencies are to be included.

750.03 Alternate Bids

It is, at times, desirable to solicit bids using alternates for specific bid items for work to be performed under the contract. The contract estimate, proposal, and summary of quantities will be divided into sections. One section will contain the base information, and there will be a section for each of the alternates. This requires the contractor to bid the base portion of the project and to bid the alternates as required by the Special Provisions. By comparing the base bid plus the alternate bids, WSDOT is able to determine the most economical combination.

One of the conditions of setting up a project in this manner is that WSDOT has to treat each of the alternates as equal, and make the decision of which is the best bid based on the lowest cost alternate plus base bid.

This is different than allowing the contractor the latitude of choosing between different material options available for a contract item.

For additional information concerning alternates refer to the EBASE users guide.

750.04 Asbestos Removal

When the removal of asbestos or items containing asbestos is required or suspected, the specifications shall include sufficient information and detail to inform the contractor of the nature and location of the asbestos. There are GSPs that are to be included in the contract provisions. The WSDOT Asbestos Abatement Manual (M 2780) is to be used to determine if there are special conditions or requirements that should be included in the contract provisions.

750.05 Assign The Risk

It is important that the contractor can determine if the risks on the project will be their responsibility or will be borne by WSDOT. In most cases, it is best to assign the risk to WSDOT. This keeps the contractor from having to inflate bid prices to offset the possible risks of doing the work. These inflated prices cost WSDOT extra dollars when the problem does not materialize.

For example, do not say “the contractor may encounter obstructions during the excavation”. The contractor has to assume that obstructions will be encountered and that they will be the contractor’s problem when they are. The unit price for the excavation will include the cost of obstruction removal, and WSDOT will pay for the removal even if there are no obstructions encountered.

It would be much better to say, “If obstructions are encountered during excavation, the Engineer will pay for the removal of the obstruction in accordance with Section 1-09.4”. Now the contractor can bid the actual cost of doing the excavation work, and rest assured that if something out of the ordinary is encountered, the cost of removal will be dealt with fairly, and if there are no obstructions encountered, there is no cost to WSDOT.

750.06 Combining Bid Items

In an effort to streamline projects to make them easier for WSDOT to manage, as well as easier for the contractors to bid, some thought should be given, on each project, to doing similar, or associated work, under a single bid item instead of having two or more items under which to work.

The lump sum item “Removal of Structure and Obstruction” has always been made up of a combination of various removal items, and this will not change. This item is not governed by an estimated cost limit for work that can be included. As long as each different removal item is precisely described as to the actual work to be performed, the locations of the work, and

the estimated quantity of work, there are no limits to the removal work that can be combined in the single “Removal of Structure and Obstruction” item. See [Section 750.12](#) for additional discussion of lump sum items.

Work that is measurable, with an estimated cost of \$5000 or greater will be a separate bid item. However, if the work is minor, estimated cost less than \$5000, and there is a *logical* item of work with which to associate the minor work, the items may be combined and the cost of the minor work included in the cost of the associated work.

The designer must remember that if items of work are combined, additional information will be required to describe the work involved and to make it clear what items are being combined, and the accuracy of the quantities provided for the combined items must be greater. For example, do not combine the cost of structure excavation with the cost of the pipe without giving a reasonably accurate estimated quantity for the structure excavation required for each pipe. Giving the *total* estimated quantity for the structure excavation does not provide the contractor a clear enough picture of the work required to make a responsible bid. Accuracy is also important, because it can be difficult to address over-runs, under-runs, or added work, when only one portion of the item combination is involved in the over- or under-run, or work is added to only one of the items of work.

Care must be taken to ensure that by combining the items of work, additional problems will not be encountered during construction because of changes in conditions or work methods. ***Items being combined shall relate to each other well, and the quantities shall be dependent on each other, so if one changes in the field, the associated quantities would be affected uniformly.***

An example of a ***good combination***:

If the project had a few locations where culverts were to be installed, it would be acceptable to include the cost of structure excavation with the per foot price for the

size and type of culvert pipes. This is a good combination because the items are closely associated, and the quantities are dependent on one another. The quantity for structure excavation will increase or decrease as the length of pipe actually installed increases or decreases over the estimated quantity.

Even though this combination of items is logical, it is imperative that the quantities for the structure excavation be calculated to a higher degree of accuracy than if the two items were separate.

This higher accuracy of the structure excavation quantity is necessary because once the quantity is calculated for the planned length of pipe, that cubic foot of structure excavation per foot of pipe relationship never changes. If the calculated structure excavation quantity is too high, the Contracting Agency is overpaying for the work actually performed. If the calculated structure excavation quantity is too low, the Contractor is not being fairly compensated for the work performed. In either case, there is no way to make adjustments to the structure excavation.

If there was a separate pay item for the structure excavation, and the quantity for the item is miscalculated, the contractor will be paid for the actual work performed, so the estimated quantity is a basis for the contractor's bid only.

The structure excavation quantity will appear on the structure note sheet as "informational only" for each associated structure code.

An example of a ***bad combination***: Do not combine clearing and grubbing with embankment compaction, even though the plan is to clear and grub only where the embankments are to be constructed. The Special Provisions will have to specify the

areas and approximate acres to be cleared and grubbed, so the contractor can include that cost in with the cubic yard price for embankment compaction. This is a bad combination of items, because the two items are not closely associated with one another. The quantity for either of these items could be increased or decreased without impacting the quantity of the other item.

If the items above are combined under a cubic yard pay item and during construction it is determined additional slope flattening is necessary within the original clearing and grubbing limits, it would be difficult to determine and justify an increase. The difficulty lies in the fact that clearing and grubbing is generally around \$6000 per acre whereas embankment compaction is around \$2.00 per cubic yard. In this case, the Contractor would be receiving a premium price for the additional embankment.

If the items above are combined under a per acre pay item and during construction it is determined additional clearing, grubbing, and embankment compaction is necessary, again, it would be difficult to determine and justify an increase. The problem is, how is a square acre converted to a cubic measurement?

To maintain consistency in the combining of items statewide, the Headquarters Plans Liaison Engineer for the region is to be consulted ***in advance*** of incorporating combined items into projects. In addition to consistency, this will provide a single office to monitor which items are routinely being combined, which item combinations work, and which do not, allowing for responsible decisions in the future.

Two items that cannot, by law, be combined with any other item of work are "Shoring or Extra Excavation Class A" and "Shoring or Extra Excavation Class B".

750.07 Legal Relations And Responsibilities To The Public

Section 1-07.1 of the standard specifications requires the contractor to comply with all Federal, State or local laws and regulations that affect work under the contract. These laws and regulations do not need to be identified in the contract. However, certain project specific regulations that may come in the form of permits, agreements, MOUs, license, variances, or others need to be identified in the contract. Examples of such regulations with conditions that need to be part of the contract are; HPA, EIS, Noise Variance, Shoreline Permit, Department of Ecology MOU, and other documents that would effect or restrict work on the contract.

In many cases the GSPs will trigger the need for the text of such documents to be listed in the Special Provision either as a fill-in or as an appendix. When construction activities require the need for a permit, variance, agreement, MOU or other regulations, the designer should always discuss the need for such documents to be put in the contract with the appropriate region support staffs.

750.07.01 Decommissioning of Well Process

The water well abandonment procedure shall adhere to the Washington State Department of Ecology regulations for abandonment of water wells following the guidelines in WAC 173-160-460 and RCW 18.104.048. Notice shall be given at least seventy-two hours in advance of commencing work. The notice shall be submitted on forms provided by the Washington State Department of Ecology with the proper fees.

750.08 Equipment Acquisition Through Construction Contracts

The practice of WSDOT acquiring, through a construction contract, items that would normally be acquired or purchased through the equipment fund, is to be avoided. This practice circumvents the state's procedures and purchasing rules.

Specific examples are survey equipment, vehicles, radios, maintenance equipment, workboats, and truck-mounted impact attenuators.

750.09 Force Account Work

Standard item number 7715, "Force Account ____," has been created to monitor the total amount of money spent on force account work. This standard item, with the appropriate fill-in information, is to be used for all force account bid items, except for those already having a standard item number.

The use of this standard item number does not preclude the need for a project specific provision to describe the work to be accomplished.

The force account item is to be placed in the appropriate section on the Summary of Quantities. (A force account removal item would be placed with the other removal items; a force account structure item would be placed with the other structure items.)

750.10 Haul Road and Detour Agreements

When the project provides a materials source, or requires traffic to be detoured from the state highway, the region is required to acquire agreements with the owners of the roads that will be used as the haul route or the detour route. The process of generating an agreement should be started as early in the design phase as possible. The lack of a completed agreement will not necessarily cause a project ad date to be delayed. It is the responsibility of the region to determine the risk involved in going to Ad without the completed agreement in accordance with the Ad and Award Manual (M2-02).

The agreement will normally provide compensation to the owner of the haul route or detour for damage done to the road by the hauling equipment, or by the extra traffic placed on the roadway. The compensation may be in the form of work to be done under the contract

to bring the roads back to pre-contract conditions, or may pay the owner a cash settlement and they would be responsible for making the repairs.

All haul roads and detours are to be clearly shown and labeled on the vicinity map.

750.11 Liquidated Damages

Liquidated damages are monies assessed or withheld from the Contractor's payment for failure to complete the project within a specified period of time. Interim liquidated damages are monies assessed or withheld from the Contractor's payment for failure to complete a part of the project within a specific period of time. Liquidated damages and interim liquidated damages are not to be considered a penalty, but reimbursement for the costs to the contracting agency for the contractor's failure to perform within the time frame of the project.

Liquidated damages for total project completion are calculated in accordance with the formula in Section 1-08.9. This formula actually calculates the estimated cost to WSDOT to continue engineering the project beyond the allotted contract time, but is presented in the contract as compensation for any and all kinds of damage resulting from an unexcused extended duration. The designer must be cautious to avoid double-charging through both the Standard Specification and a separate Special Provision for the same extended days.

Large or complex projects often have interim completion times with liquidated damages, for such things as failure to open traffic lanes on time. These types of liquidated damages can be assessed in time increments that range from 15-minute to full-day segments. Liquidated damages assessed for failure to have a lane open to traffic at the specified time are an estimate of the actual cost to contracting agency and the traveling public for not having the lane available. The Headquarters Transportation Data Office (TDO) has a computer program that calculates the cost, based on traffic counts. This

is the only acceptable way of calculating these costs.

Once the designer has received these calculated costs from TDO, the Region must make the determination, whether the damages represent a sufficient benefit to the state to put them in the contract.

Liquidated damages for reasons other than lane or ramp closures are allowed, but the same rules will apply. The designer must be able to identify and document the cost associated with the damage. The Headquarters Construction Office shall approve this information.

The Special Provisions will clearly state when the assessment of liquidated damages of this type will begin and end. Interim liquidated damages for two or more separate reasons can be additive for the same time period.

What cannot be additive is any sort of interim liquidated damages on top of liquidated damages which are being assessed according to the Standard Specification for failure to complete project on time. If this is a desired outcome, the Standard Specification will have to be edited and this editing will require the approval of the Headquarters Construction Office.

All liquidated damages that are different from the Standard Specification require the approval of the Headquarters Construction Office or the delegated Region official. Submit the proposed provision and the calculations supporting the damage amount.

A copy of the data used to justify liquidated damages and a copy of the Headquarters Transportation Data Office information are to be placed in the PS&E portion of the project file.

750.12 Lump Sum Bid Items

A lump sum bid item may include several items of work, or the same item of work at different locations. The Special Provisions shall include the description of work and the approximate

quantities for bidding purposes. The quantities listed should be double checked to avoid contractor claims.

Only work that can be easily defined by quantity, amount of effort, and equipment and labor requirements are to be included in lump sum items. If any of these items are unknown, or even uncertain, payment at unit prices or by force account would be more appropriate.

The backup data used to determine the estimated cost for lump sum bid items is to be placed in the PS&E portion of the project file.

The designer must decide if each lump sum bid item is to be prorated or if individual summary of quantities column costs are to be assigned for each lump sum bid item.

750.13 “Might Need This Item” Items

The designer is advised to avoid including items in the project that they think "might" be needed. This is particularly important for items such as borrow or excavation below grade, because the contractor bids, at a high price, the small quantity shown, and then finds a way to use a considerable quantity of the item on the project.

If it is unknown if the item is required, it is best to leave it out of the project and let the construction office add the item by change order if necessary. History states this is the cheapest, easiest way of handling these items.

There will be times when this sort of item may be appropriate, and in these rare cases, it should be included as a force account item, so the Engineer has complete control of the work.

750.14 Paths and Trails

WSDOT tracks expenditures for pedestrian and bicycle facility improvements so we can report to the Legislature and the public this information per RCW 47.30. Washington State Department of Transportation will also be able to use this data to measure performance of our transportation system.

The following are example types of work that are to be included in the calculations for pedestrian and bicycle facilities. (See Design Manual Division 1020 for additional definitions and information.)

- Shared Use Path: A facility on exclusive right of way with minimal cross flow by motor vehicles designed and built primarily for use by bicycles but is also used by pedestrians, joggers, skaters, wheelchair users (both non-motorized and motorized), and others.
- Structures: An overpass or underpass, tunnel, or bridge to provide continuity of a shared use path, bikeway, walkway, hiking trail, or sidewalk around, over or across obstacles.
- Sidewalk: A walkway separated from the roadway with a curb, constructed of a durable, hard and smooth surface such as concrete or asphalt, designated for preferential or exclusive use by pedestrians. This category is to include sidewalk or shared use path on structures.
- Bike Lanes/ Bikeway: Any trail, path, portion of a highway or street or shoulder specifically signed and/or marked for bicycle travel.

Additional items to be included in these calculations:

- Pavement markings associated with pedestrian and bicycle facilities such as:
 - Crosswalks: Portion of the roadway designated for pedestrian crossings, marked or unmarked; unmarked crosswalks are the natural extension of the shoulder, shoulder curb line or sidewalk. Improvements

to crosswalks consist of markings to delineate the crosswalks for motorists' detection, or may consist of different surface treatment such as concrete or colored asphalt to distinguish it as the crossing area. Another type of crosswalk is a "raised" crosswalk, intended to enhance visibility of the pedestrian to the motorist as well as encourage the motorist to slow down.

- School Crossing: A crossing adjacent to a school or on established school pedestrian routes, designated as a preferred crossing for school users.
- In-Pavement Flashing Warning Devices: A traffic-warning device used at pedestrian crosswalks.
- Preferential Lane Symbols and Signing: Identified signs and/or pavement markings that designate for bicycle use.
- Pedestrian Signals/ Detectors: Electronic devices used for controlling the movement of pedestrians at signalized mid-blocks or intersections, which may include the "walk/don't walk" messages or the symbolic walking person/hand message.
- Pedestrian Scale Lighting: Overhead street lighting which is typically over the sidewalk instead of the roadway, and at a lower

height than typical street light fixtures; providing illumination for pedestrians instead of motorists.

- Bicycle Facilities Lighting: Illumination necessary to achieve minimum levels of safety, security, and visibility.

Projects that are done specifically for pedestrian/bicycle facilities should be included in the calculations in their entirety. These may include such items as:

- Curb Ramps: The area of the sidewalk, usually at the intersection, that allows easy access/transition for wheelchairs, strollers, and other wheeled equipment, between the sidewalk and the street.
- Bulb Out/Curb Extension: A curb and sidewalk bulge or extension out into the roadway used to decrease the length of a pedestrian crossing.
- Pedestrian Refuge Island: A raised area between traffic lanes that provides a place for pedestrians to wait to cross the street.
- Planting or Buffer Strip: A strip of land that physically and/or visually separates two land uses, especially if the uses are incompatible. These strips are important to separate pedestrians from motor vehicles.

Shoulders: Paths and Trails calculations for bicycle facility improvements shall be done if an existing shoulder is widened to a minimum of 4' to allow bicycle or pedestrian use and the shoulder meets the following condition:

The shoulder is on a Rural Bicycle Touring Route, which are US and State Routes 2, 4, 8, 12, 14, 20, 97, 101, 195, and 503.

Overlaying an existing shoulder with HMA or bituminous surface treatment (BST) does not constitute the need for paths and trails calculations.

For projects meeting the above criteria, the paths and trail calculations are as follows; 50% of the cost to widen the shoulder to the ultimate shoulder width.

If further clarification is required please call Highways and Local Programs 360-705-7372.

750.15 Permits

A conscientious effort shall be made to insure that all permits necessary for the project are completed and signed prior to the project going to Ad. However, in the event that this cannot be accomplished it is the responsibility of the region to determine the risk involved in going to Ad without the completed permit in accordance with the Ad and Award manual (M2-02).

750.16 Proprietary Item Sole Source, Brand Name and the Qualified Products List (QPL)

Approval of Proprietary Items

WSDOT uses competitively acquired products to fulfill the material requirements of a contract. With prior approval, from the Assistant State Design Engineer, proprietary materials, work (by consultants, for example), manufacturers, and products can be incorporated into a project without the benefits of the competitive bid process. A proprietary item is any item that is exclusively owned by a private individual or corporation under a trademark or patent. All projects advertised by WSDOT for construction that incorporate proprietary items, regardless of funding sources, require written approval for the use of proprietary items.

By the Stewardship Agreement, WSDOT has adopted the Code of Federal Regulations (CFR) for approval of proprietary items on all projects. CFR23 Chapter 1 Part 635 Section 635.411 provides specific guidelines as to use and

approval of proprietary items. The guidelines are as follows:

A proprietary item will not be approved for use in a project unless one or more of the following apply:

1. It is purchased or obtained through competitive bidding with other items.
2. It is essential for synchronization with existing highway facilities:
 - a. A certain product (or manufacturer) is to be used because the product (or manufacturer) is essential to the existing highway. A product could be essential due to the fact it has been tested with other components and is documented to work with existing components or that it is a one of a kind item. A product or manufacturer could be essential because using anything else would require replacing other components of the existing highway system.
 - b. No other equally suitable alternative exists:
 - i. The product (or manufacturer) is one of a kind.
 - ii. Other workable alternative products or manufactures are not equal, in longevity, cost, delivery, durability, compatibility, warranty, etc.
3. It is used for research or for a distinctive type of construction

on relatively short sections of road for experimental purposes:

- a. Research to obtain experimental information on a product or manufacturer for the public good. When requesting this type of usage, approval documentation showing the scheduling, monitoring, results, and conclusion are required with the request.
4. It is deemed as being in the public interest:
- a. If a significant investment has been made in a product through training, parts, maintenance familiarity, equipment and warranties, approval may be granted in that retaining the product is in the public interest.
 - b. If the product (or manufacturer) is needed for coordination of systems between agencies such as police, fire, hospitals, WSDOT emergency services and others, approval may be granted in that retaining the product (or manufacturer) is in the public interest.

Definitions:

Proprietary Item

A proprietary item/material is one that someone holds some sort of legal control over its use; such as a patent. Someone who wants to use the item or material normally has to pay a fee to use the item on top of the cost of the item/material.

Sole Source Item

A sole source item/material is one that can only be obtained from one supplier or manufacturer.

Using Proprietary Items in Contracts

Before specifying any proprietary material, work, manufacturer or product in a project, written approval must be granted. Per the Design Manual Figure 330-4 on New/Reconstruction (Interstate only) prior to use on Federal-aid contracts FHWA must approval of proprietary items. On NHS and Non-NHA projects the Assistant State Design Engineer assigned to the region must approve of proprietary item use. It is the designer's responsibility to get a memorandum of justification, from whoever is requesting the use of the proprietary item, submitted to the Assistant State Design Engineer in sufficient time for it to be reviewed, acted upon, (sent to FHWA if required) and adjustments made to the contract should the use be denied.

The memorandum of justification should include a brief description of where the project is located, what constitutes the requirement for the proprietary item and justification for the use of the proprietary item. The justification shall include why the Department believes the use of the proprietary item is in the public interest. Justifications should state why there is no equally suitable alternate or why it is essential for synchronization with existing facilities, and why a specification can not be written to get only the products that will meet the objectives.

To specify a proprietary item once it has been approved, the designer will, in the Special Provisions, give the product manufacturer, the model, the model number, and any additional information required to ensure that only the specified item will be furnished. There will usually only be one item named in the Special Provisions when listing a proprietary item.

When two or more different, acceptable products or manufacturers are named followed by the words "or approved equal" and include a *performance specification stating what will make the product an approved equal, are

included, the item **is not** a proprietary item.
*(The performance specification is **required**.)
See Brand Name specifying.

The phrase “or approved equal” will never follow the naming of a proprietary item in a Special Provision. There are no options allowed. The Contractor’s bid is to reflect the one item specified.

Brand Name Specifying in Contracts

The alternate to proprietary item specifying is brand name specifying. When brand name specifying, the designer is providing the bidder with options by naming at least two products or manufactures that are acceptable, and allowing for “approved equals” followed by a performance specification. When this is done, no approval is required for usage: it is not a proprietary item.

A good specification for brand name specifying will read as follows:

The (whatever it is) furnished shall be
(brand name, model), (brand name, model),
or an approved equal having the following
features (functions):

1. (feature)
2. (feature)
3. (feature)

In order to find the two acceptable items, the designer had to be looking for certain features or functions. These features or functions are the ones that need to be included in the Special Provision.

Qualified Products List

The Qualified Products List (QPL) is a list of products and materials that have been pre-approved for use on WSDOT projects. If the contractor chooses to provide items listed in the QPL, there is no need to submit a request for approval of manufacturer (RAM), and for some products or materials, indicated on the QPL list, no requirement to submit the items for testing

prior to using the product or material on the project.

The QPL has absolutely nothing to do with proprietary items or brand name specifying. The pre-approval of items in the QPL does not mean that they are the only products or materials that will be allowed. The contractor can provide any product or material that meets the specifications whether they are listed in the QPL or not.

There is a definite difference between proprietary item specifying and brand name specifying, and the Qualified Products List has nothing to do with either proprietary or brand name specifying.

750.17 Removal of Pavement, Sidewalks, and Curbs.

When pavement, sidewalk, or curb removal is required outside the limits of an excavation area, it can be included in the lump sum price for “Removal of Structures and Obstructions”, or separate bid items may be established for the work.

If the work is included as part of the lump sum item, the Special Provisions will indicate the approximate locations and quantities. If separate bid items for removal are established, the individual items will appear on the Quantity Tabulation sheets, where the approximate locations and quantities will be indicated. In either case, the locations of the removal items will be indicated on the plans as well.

When pavement, sidewalk, or curb removal is required within the limits of an excavation area, nothing is required on the plans or in the Special Provisions. All costs for the removal of the pavement, sidewalk, or curb are included in excavation work and no additional compensation is made to the contractor.

The other possibility is that for some reason, the designer wants the contractor to remove the pavement, sidewalk, or curb that lies within an excavation area prior to performing the

excavation. In this case, the work would be handled as described above for removal outside of an excavation area.

750.18 Retaining Walls

When a project contains standard retaining walls, as detailed in the Standard Plans, the contract plans shall include the following:

1. A plan and profile of the wall along with original and proposed ground profiles at the front and back faces of the wall.
2. All existing utilities in the vicinity of the wall.
3. Wall geometry.
4. Right of way limits.
5. Construction sequence and stage construction sequence requirements.
6. Highest permissible elevation for foundation construction.
7. The location, depth, and extent of unsuitable material.
8. Quantities for the wall and backfill materials.
9. Details of wall appurtenances such as traffic barriers, coping, wall face treatment and limits of treatment, drain outlets, location of signs and lighting, including conduit locations.

In general, a site that will support a standard cantilever retaining wall will also support a proprietary retaining wall. If the region decides to provide pre-approved proprietary retaining wall systems as an alternate, the Headquarters Materials Laboratory Foundation Engineer and the Headquarters Bridge and Structures Office Bridge Project Engineer need to be consulted on the selection of suitable wall systems for the conditions. In order to evaluate aesthetic

considerations, a rough site plan shall be submitted to the Headquarters Bridge Project Engineer for review.

The region will be required to contact the suppliers of the selected retaining wall systems to confirm the adequacy of the systems for the given situation. The Headquarters Materials Laboratory Foundation Engineer is to be contacted to provide assistance in evaluating the systems for overall stability, and to provide soil criteria for design.

The Headquarters Bridge and Structures Office will prepare the Special Provisions for pre-approved proprietary retaining walls, including design criteria. The Headquarters Foundation Engineer will be consulted for establishing criteria for design. The Special Provisions will require the proprietary wall manufacturer selected by the contractor to submit shop plans, design criteria, and calculations to the Engineer for approval. The Headquarters Bridge and Structures Office will then review the design submitted by the pre-approved proprietary wall manufacturer.

In addition, keep in mind that these are alternates that may be selected by the contractor and that all of these alternates are proprietary. On all federal aid projects, two must be selected or reasons for using fewer alternates must be submitted to the Assistant State Design Engineer assigned to the region, for approval. Proprietary retaining wall systems are pre-approved for certain heights. Walls that exceed the pre-approved height will be considered special designs and each must be submitted to the Headquarters Bridge and Structures Office for review and approval.

750.19 Roadside Considerations

For all projects requiring work outside the shoulders, it is important that the designer contact the region Landscape Architect or Headquarters Landscape Architect (for regions with no Landscape Architect) to determine if there are ways to minimize impacts to the roadside.

The Roadside Classification Plan outlines requirements, based on project type, for re-vegetation, permanent erosion control, irrigation and landscape planting. The Landscape Architect can assist the designer in fulfilling these requirements.

750.20 Royalties on Materials Sites

If the contracting agency furnishes a materials site owned by others, and the owner requires a royalty be paid for materials removed from the site, the dollar amount of the royalty, and who will be responsible to pay the royalty, will be specified in the Special Provisions. FHWA has authorized federal aid participation in royalty payments.

750.21 Shoring or Extra Excavation

All excavation 4 feet or more in depth shall be shored, protected by cofferdams, or shall meet the open-pit requirements specified in the Standard Specifications.

RCW 39.04.180 requires that a separate bid item for shoring or extra excavation be included in the estimate and proposal. In no case shall the costs for shoring or extra excavation be included in other bid items.

750.22 Specializing Out Right of Way Parcels

It may be necessary to identify right of way parcels that are unavailable to the contractor for construction at the time the contract is awarded.

The Special Provisions shall be specific as to the location of the parcels and the estimated dates of availability to the contractor. The region Real Estate Services office can provide a reasonable availability date to go in the Special Provision. There is no problem if the property becomes available early, but there can be big problems if the property is not available by the date promised.

Right of way parcels that are specialed out must also be indicated on the right of way or alignment/right of way plans by drawing in the

appropriate property lines and by cross-hachuring the parcels. The plans shall indicate that the cross-hachured parcels are unavailable and there will be a note referencing to the Special Provisions.

When right of way is being specialed out, the order of work has to be examined to ensure that the project sequencing is not adversely affected because portions of the right of way are not available for immediate use.

750.23 Standard Items

The Standard Bid Item Table is not a complete listing of standard items. It is a list of the bid items being tracked in the Unit Bid Analysis (UBA) system. Code numbers referred to as the Standard Item Numbers tracks them.

Standard items are, in reality, those items that appear in the payment statements in the Standard Specifications. Many of these payment statements, like the following, are written with blanks:

HMA for Preleveling Cl. ____ PG ____",
per ton.
"Catch Basin Type ____", per each.
"Manhole Additional Height ____ In.
Diam. Type ____", per foot.

If the blanks are filled in with the expected information and the information in the Standard Specifications applies, they are standard items even though they may be a size, type or class not shown in the standard item table.

Minor revisions, with little or no impact on the cost, can be made to the material or construction requirements in the Standard Specifications, and they can remain standard items. Care must be taken, however, not to mislead the contractor by making major revisions that could affect the cost of the item substantially, and call it the standard item. In these cases, it is best to develop a nonstandard item.

750.24 Standard Plans

WSDOT's Standard Plans are made a part of contracts by reference in the Special Provisions. Plan details are not to be drawn that duplicate details in the Standard Plans, and the designer is not to redesign a standard plan by detail in the project. It is important that standard work be done the standard way, and that standard materials be used whenever possible, because in almost all cases, standard stuff costs less.

750.25 State Force Work and State Furnished Materials

The designer shall provide written justification for all state furnished materials and all state force work to be performed on all projects, in accordance with RCW 47.28.030 and RCW 47.28.035. This justification must go into the documentation file. If state force work or supplied materials are covered by one of the previously approved blanket approval items [See **Blanket Approval Items**] the dollar limit set by RCW 47.28.030 still applies and documentation must be on file.

DOLLAR LIMITATION

The justification for both state furnished materials and state force work must show that it is economically cost effective. ***It does not matter if the state supplied material was purchased, through competitive bidding or not, the total cost is to be included into the aggregate sum total for the project. It also does not matter, if the state supplied material and the state force labor are relevant to each other or not, the total cost is to be included into the aggregate sum total for the project.*** As of July 1, 2005 the limitations per RCW 47.28.030 is sixty thousand dollars (\$60,000), or, PROVIDED, That when delay of performance of such work would jeopardize a state highway or constitute a danger to the traveling public, the work may be done by state forces when the estimated cost is less than one hundred thousand dollars (\$100,000).

[See **EXCEPTIONS** for material/equipment only dollar limitation exception.]

The maximum total dollar value of work done by state forces, including labor, materials and equipment, is as stated in the RCW below per ***construction project***. State force work shall be listed as below the line items in the project estimate.

See EBASE Manual "Non- Bid Items Tab" for guidelines when engineering and contingencies are used or not used in regard to state force work and for state furnished materials.

These RCWs read as follows:

RCW 47.28.030

Contracts -- State forces -- Monetary limits
-- Small businesses, minority, and women contractors -- Rules.

A state highway shall be constructed, altered, repaired, or improved, and improvements located on property acquired for right of way purposes may be repaired or renovated pending the use of such right of way for highway purposes, by contract or state forces.

The work or portions thereof may be done by state forces when the estimated costs thereof is [are] less than fifty thousand dollars and effective July 1, 2005, sixty thousand dollars: PROVIDED, That when delay of performance of such work would jeopardize a state highway or constitute a danger to the traveling public, the work may be done by state forces when the estimated cost thereof is less than eighty thousand dollars and effective July 1, 2005, one hundred thousand dollars.

When the department of transportation determines to do the work by state forces, it shall enter a statement upon its records to that effect, stating the reasons therefore.

To enable a larger number of small businesses, and minority, and women contractors to effectively compete for department of transportation contracts, the

department may adopt rules providing for bids and award of contracts for the performance of work, or furnishing equipment, materials, supplies, or operating services whenever any work is to be performed and the engineer's estimate indicates the cost of the work would not exceed eighty thousand dollars and effective July 1, 2005, one hundred thousand dollars.

The rules adopted under this section:

- (1) Shall provide for competitive bids to the extent that competitive sources are available except when delay of performance would jeopardize life or property or inconvenience the traveling public; and
- (2) Need not require the furnishing of a bid deposit nor a performance bond, but if a performance bond is not required then progress payments to the contractor may be required to be made based on submittal of paid invoices to substantiate proof that disbursements have been made to laborers, material men, mechanics, and subcontractors from the previous partial payment; and
- (3) May establish prequalification standards and procedures as an alternative to those set forth in RCW 47.28.070, but the prequalification standards and procedures under RCW 47.28.070 shall always be sufficient.

The department of transportation shall comply with such goals and rules as may be adopted by the office of minority and women's business enterprises to implement chapter 39.19

RCW with respect to contracts entered into under this chapter.

The department may adopt such rules as may be necessary to comply with the rules adopted by the office of minority and women's business enterprises under chapter 39.19 RCW.

[1999 c 15 § 1; 1984 c 194 § 1; 1983 c 120 § 15; 1977 ex.s. c 225 § 3; 1973 c 116 § 1; 1971 ex.s. c 78 § 1; 1969 ex.s. c 180 § 2; 1967 ex.s. c 145 § 40; 1961 c 233 § 1; 1961 c 13 § 47.28.030.

Prior: 1953 c 29 § 1; 1949 c 70 § 1, part; 1943 c 132 § 1, part; 1937 c 53 § 41, part; Rem. Supp. 1949 § 6400-41, part.]

RCW 47.28.035

Cost of project, defined.

The cost of any project for the purposes of RCW 47.28.030 shall be the aggregate of all amounts to be paid for labor, material, and equipment on one continuous or interrelated project where work is to be performed simultaneously.

The department shall not permit the construction of any project by state forces by dividing a project into units of work or classes of work to give the appearance of compliance with RCW 47.28.030.

[1984 c 194 § 2.]

APPROVAL

The justification and estimate for work to be done by state forces and state furnished materials is to be submitted to the Assistant State Design Engineer assigned to the region, in sufficient time to allow for review and approval prior to advertising of the project. If the project is new/reconstruction on the interstate, the justification for state furnished materials and for state force work requires FHWA approval, per the Design Manual Figure 330-4, this must be submitted through the Region Assistant State

Design Engineer to FHWA. FHWA approval is also required when federal funding is present on the project. When FHWA approval is required, the justification must also include a request for federal funding participation.

BLANKET APPROVAL ITEMS

There are a few items of work that have received a blanket approval to be performed by state forces and receive FHWA funding participation. They are striping, pavement marking, second stage fertilizing, and one-way piloted traffic control. These items are still governed by the total dollar value allowed for state force work, a statement and estimate must be in the file but approval from the Region ASDE or FHWA is not required.

EXCEPTIONS

When the State provides materials and or equipment and there is NO state labor performed by state forces within the project, the dollar limitation per RCW 47.28.030 does not apply. For example, if WSDOT provides a \$90,000 sign bridge, as long as there is no state force on the project, this dollar amount can be approved. If there is any state force labor on the project, even unrelated work such as removal of silt fence, that is going to be a below the line item, then the aggregate total of materials and labor would exceed the \$60,000 per RCW 47.28.030 and therefore can not be approved.

Work performed off the state roadway rights of way may not be subject to RCW 47.28.030 and therefore no limit on state supplied materials or state force labor would apply.

Work that does not involve state or federal funds is not subject to RCW 47.28.030 and therefore has no limit on supplied materials or state force labor. For example, a developer project that includes the installation of a new traffic signal where the work is funded by the developer.

Work that is *not* to be considered state force work is inspection of any type, material testing, monitoring, public relations work, or any kind of investigation or research. If state forces do any of these types of work, it is to be included in

the engineering and contingencies. If the cost of this work is substantial, it can be used as justification to increase the engineering and contingency percentage to offset the costs.

Inspection is defined as work performed to insure that material or contractor installation meets the specifications outlined in the contract **after** the contract has been awarded. Inspection **does not** include work performed to correct the deficiency or failure to meet specifications.

Material testing is defined as work performed prior to contract award or prior to the material being delivered to the contractor for insuring that the material meets the specifications outlined in the contract. Material testing includes diagnostic testing and/or modifications to the material or equipment to insure compatibility and interoperability with the existing infrastructure. For example, when electronic equipment is procured, material testing would include assembling the equipment into a system and modifying software or hardware components as necessary to insure the system operates as specified and is compatible with existing electronic equipment and/or software.

See [Figure 7-1](#) State Force Work/Materials Flow Chart

750.26 Strip Maps

Strip maps may be used on projects such as overlays, fog seal, BST, stockpiling, signing, safety, and similar projects when a great deal of detail is not required.

Many times a strip map can be used for a series of plans within a set of plans, such as for the signing series, if the signing is simple destination type signing and requires no real detail. By simply showing the construction center line with stationing and the required signing information, it is possible, in most cases, to stack the information on the sheet such that twice the information can be displayed on each sheet. Remember also that most information that will be shown on strip maps is not really

alignment dependent, i.e. a curve in the highway is not going to affect the showing of a sign at the correct station, so the center line can appear as a straight line on the strip map.

The use of strip maps when possible is not only an option, but also a recommended procedure, to reduce the total number of plan sheets in the project.

The use of photographic strip maps is allowed if the work can be shown adequately and if a clear copy can be assured.

750.27 Temporary Erosion and Sediment Control Plans

The goal of a Temporary Erosion & Sediment Control (TESC) plan is to prevent erosion damage to projects and sediment-laden runoff that can harm the environment and violate Washington State water quality standards. A TESC plan shall describe the best management practices (BMPs) selected for a project. A BMP is a design, procedural, or physical practice that prevents erosion or traps sediment.

A TESC plan must be prepared if a construction project adds or replaces (removal of existing road surface down to base course) 2,000 square feet or more of impervious surface or disturbs 7,000 square feet or more of soil. Projects that disturb less than 7,000 square feet of soil must address erosion control, but a stand-alone TESC plan is optional.

In addition to the plan sheets, the Standard Specifications Division 8-01, a special provision or the applicable GSP with fill in, will describe the TESC plan. If the fill in GSP is utilized do not just cut and paste the narrative portion from the TESC template. The fill in shall address the direct details that the Contractor will be responsible for such as items of work, types of materials, duration, maintenance and removal of items and measurement and payment of nonstandard items as applicable to the specific contract. The plan sheets or special provisions shall show or list the locations of the BMPs.

It is required that WSDOT staff attend the Construction Site Erosion & Sediment Control Certification Course before they prepare a TESC plan. Multiple resources for plan preparation exist and include the Highway Runoff Manual, Design Manual, roadside Manual, Hydraulics Manual, the Certification Course manual, Standard Specifications (Section 8-01), Standard Plans, and the TESC template. The template provides step-by-step guidance on preparing the narrative and is available on line at the following address: <http://www.wsdot.wa.gov/environment/wqec/docs/TESCPlanTemplate.doc> . Other resources include regional Water Quality/Hydraulics staff, Environmental staff, and the Statewide Erosion Control Coordinator.

Some regions require that TESC plans prepared by the project office be routed through the regional Water Quality/Hydraulics office or Environmental staff for review. Once complete, the TESC plan becomes incorporated into the contract documents.

750.28 Truck Weighing Stations

The components of truck weigh stations for which federal funds can be used are:

1. Additional right of way.
2. The construction of access lanes and vehicle standing and storage areas.
3. The illumination of the access lanes and vehicle standing and storage areas.

The construction of the scale house and its service facilities, scale pit and scale are not eligible for federal aid participation.

For additional information on truck weigh stations, see the Design Manual.

750.29 Vehicle Weight Limitations Within Project Boundaries

The designer is to review each individual project to determine if the vehicles employed in the construction that exceed the gross weight limitations (RCW 46.44) can be tolerated.

When existing bridges or major drainage structures are involved, overweight clearance is obtained from the Headquarters Bridge and Structures Office. The clearance information provided by the Bridge and Structures Office is to be included in the PS&E portion of the project file.

The designer is to use the information in the Standard Specifications, or include the appropriate GSP in the Contract Provisions, to inform the contractor of the load limit restrictions for the project.

750.30 Warranties and Guarantees

WSDOT may choose to include warranty clauses in Federal-aid highway construction contracts as specified in Code of Federal Regulations, Title 23, Volume 1, revised April 1, 2001 under Subpart D - General Material Requirements Sec 635.413 Warranty Clauses as follows:

Sec 635.413 Warranty Clauses

The SHA (State Highway Agency) may include warranty provisions in National Highway System (NHS) construction contracts in accordance with the following:

- (a) Warranty provisions shall be for a specific construction product or feature. Items of maintenance not eligible for Federal participation shall not be covered.
- (b) All warranty requirements and subsequent revisions shall be submitted to the Division Administrator for advance approval.
- (c) No warranty requirement shall be approved which, in the judgment of

the Division Administrator, may place an undue obligation on the contractor for items over which the contractor has no control.

- (d) A SHA may follow its own procedures regarding the inclusion of warranty provisions in non-NHS Federal-aid contracts.

There may be occasions when the regions have the need to include warranty and/or guarantee clauses in State funded contracts. The region will notify the Construction Materials Engineer at Headquarters Materials Laboratory and request concurrence to the specification prior to including the Special Provision in the contract documents.

The contractor is required to pass along to WSDOT all manufacturers' normal guarantees and warranties for products and equipment installed on the project.

750.31 Washington State Laws

Following is a partial listing of laws that are frequently used in the administration of WSDOT contracts:

1. RCW 4.24.360- Any clause in a construction contract that disallows a contractor, subcontractor, or supplier any damages due to unreasonable delays in performance caused by WSDOT is void and unenforceable.
2. RCW 18.104.048 See [Section 750.07.01](#) of this manual. Prior notice of well construction, reconstruction, or decommissioning of wells is required.
3. RCW 18.27.090 - Contractors are exempt from contractor registration laws provided they are pre-qualified by WSDOT.
4. RCW 19.122.040 - See [Section 460.15](#) in this manual for the contents of this

RCW. This subject deals with existing utility locations.

5. RCW 39.12 - See Section 1-07.9 of the Standard Specifications. This subject concerns wages.
6. RCW 39.19 - See the GSP concerning minority and women businesses.
7. RCW 46.44 Vehicle Weight Limitations Within Project Boundaries.
8. RCW 47.28.030 - See [Section 750.25](#) in this manual. This subject deals with state force work and materials.
9. RCW 47.28.035 - See [Section 750.25](#) in this manual. This subject is related to RCW 4.28.030 state force work and materials.
10. RCW 47.28.070 - See Sections 1-02.1 of the Standard Specifications. This subject concerns prequalification of contractors.
11. RCW 47.28.100 - See Sections 1-03.3 and 1-03.5 of the Standard Specifications. Contractors are allowed 20 days after award to execute a contract. WSDOT may extend this time no more than an additional 20 days.
12. RCW 47.28.120 - See Section 1-09.9 of the Standard Specifications. Contractors must file their claims within 180 days after acceptance.
13. RCW 47.30 - requirements for paths and trails.
14. RCW 49.28 - Wages — overtime.
15. RCW 60.28.010 - See Section 1-09.9 of the Standard Specifications. WSDOT must hold 5 percent of the contract amount in reserve for

material and workman claims. Contractors can post a bond in lieu of reserve fund.

16. RCW 78.44 – Contract Reclamation Plan is required for every WSDOT contract that contains a WSDOT furnished materials source. See [Section 460.05](#) of this manual.

Some of the laws are referenced in the Standard Specifications or the GSPs. Some are not. In either case, these laws are not to be altered, so all Special Provisions that appear to do so should be questioned.

750.32 Washington State Patrol (WSP) Traffic Control Assistance

The following factors are to be considered when evaluating the need to include WSP traffic control assistance in the project:

1. What type of construction is being done?
2. How complex is the traffic control?
3. Are there possibilities of speed reductions?
4. What are the traffic volumes?
5. Is there nighttime work?
6. Are there special geometric conditions?

Refer to Instructional Letter IL 4008.00 and to the Traffic Manual for recommended enhanced enforcement in the work zone.

If it is decided that WSP traffic control assistance is warranted, the region program manager must be contacted to set up the work order and to verify that funds are available in the master GC 9131 agreement. The region program manager will contact Headquarters Field Operations Support Service Center to obtain a Task Order number, and will then prepare and execute the Task Order in the normal manner and submit it to the Headquarters Program Manager for action.

The designer will include the money in the project estimate as a below the line item.

750.33 Working Days

The designer needs to give careful consideration to the number of working days allowed for a project. Too many working days can cause as many problems as not enough working days.

The determination of working days for the different work items is to be based on production rates and other considerations. (see [Appendix 6](#)) Using the time required for the individual work items, the critical path method is then used to determine how the project work will fit together, and the total number of working days will be determined.

The working days required for bridge construction are to be coordinated with the working days required for the other construction.

The CPM will be placed in the PS&E portion of the project file.

750.34 Contractor Provided

Surveying

The IFPTE Union Agreement with WSDOT requires that the Union be notified when contractor-provided surveying is included in a contract (the Union does not give approval or concurrence, they only request they be notified).

To include contractor surveying in a project, the PEO first obtains the concurrence of the Region Operations Office. Prior to finalizing the PS&E, the PEO notifies the Region Plans Office a project will include contractor surveying and provides the project name, construction PE name and the reason(s) for including surveying as contractor-performed work. The Region Plans Office then prepares and sends notification to the Union.

STATE FORCE WORK/MATERIALS

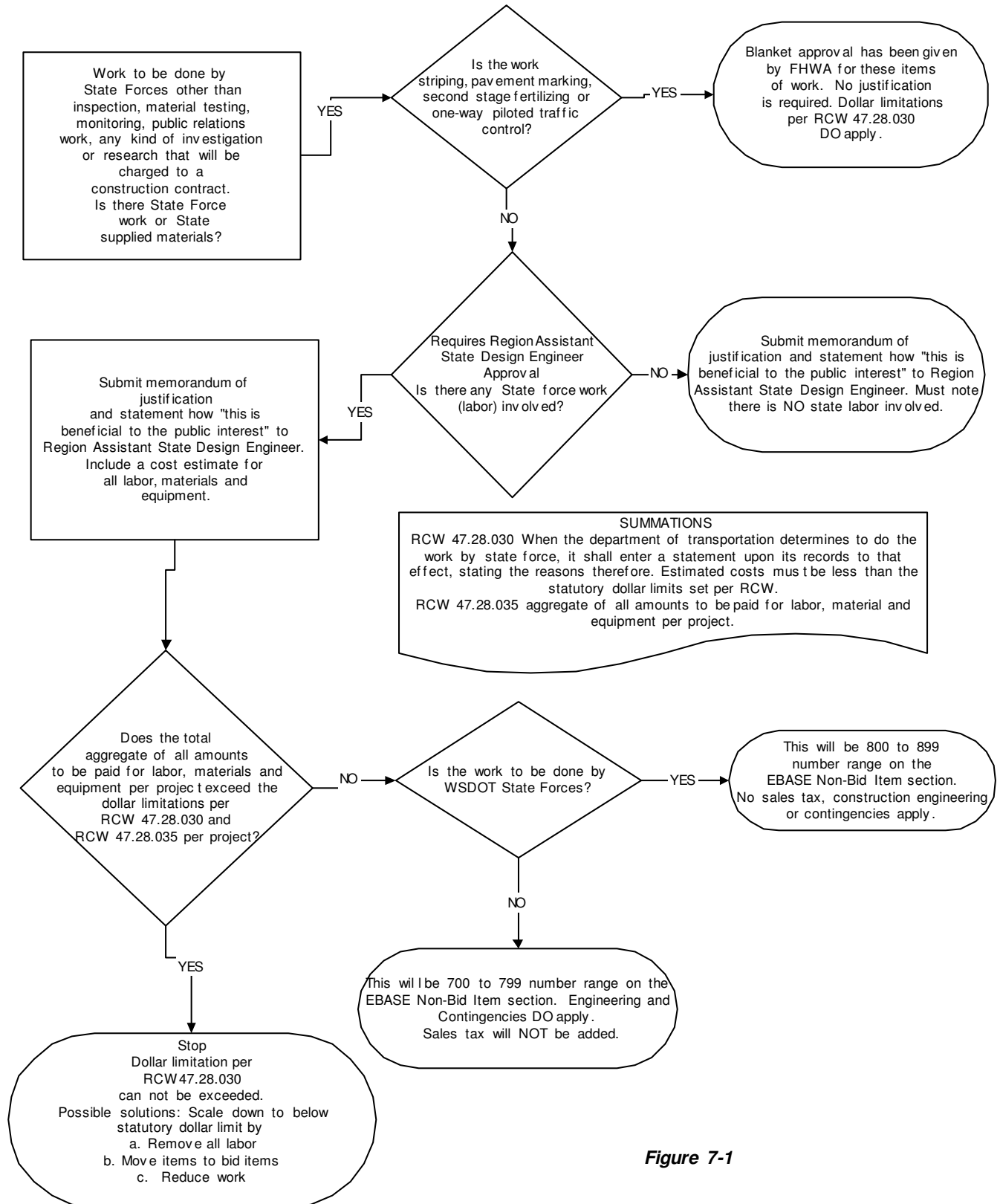


Figure 7-1

This appendix provides information to the designer on determining contract time.

DETERMINATION OF CONTRACT TIME

I. Background

- A. Contract time is the maximum time allowed in the contract for completion of all work contained in the contract documents. Contract time often arises as an issue when the traveling public is being inconvenienced and the contractor does not appear to be aggressively pursuing the work. There may be a number of reasons for a project to appear dormant, such as weather limitation, concrete curing times, materials arriving late, etc. However, all too often the causes are traceable to excessive time originally established by the contracting agency to complete the project or poor contractor scheduling of construction operations.
- B. The duration of highway construction projects in many instances is more critical today than it was in the past. Several of the reasons are listed below:
 - 1. Traffic volumes on most highways are generally continuing to increase. This is creating a greater impact on the motoring public in both safety considerations and costs.
 - 2. Proper selection of contract time allows for optimizing construction engineering costs and other resources.

II. Elements in Determining Contract Time

- A. Written procedures for the determination of contract time are important so that production rates and other considerations are applied uniformly throughout the State. These procedures should account for significant geographic, and climatic differences throughout the State, which could affect contractor productivity rates. The fact that some types of work can be undertaken during certain times of the year while other types of work cannot, should be addressed. Where applicable, the affect of working under traffic also needs to be considered.
- B. The reasonableness of the contract time included in contracts is important. If time is insufficient, bid prices may be higher and there may be an unusual number of time overruns and contractor claims. If, on the other hand, the time allowed is excessive, there may be inefficiencies (costs) by both the State and the contractor. Also, the public may be inconvenienced unnecessarily and subjected to traveling on roadway where safety is less than desirable for an extended period of time. In establishing contract time the State should strive for the shortest practical traffic interruptions to the road user. If the time set is such that all work on a project may be stopped for an extended period (not including necessary winter shutdowns) and the contractor can still

complete the project on schedule, it means the contract time allowed was excessive. (There may be some exceptions as indicated in “Factors Which Influence Contract Time”) and “Other Factors Which Influencing Contract Time.)”

C. For most projects, the essential elements in determining contract time are:

1. Establishing production rates for each controlling item,
2. Adapting production rates to a particular project, and
3. Computation of contract time with a progress schedule.

EXPERIENCE AND JUDGMENT SHOULD BE USED IN THE FINAL DETERMINATION OF CONTRACT TIME.

III. Establishing Production Rates

A. A production rate is the amount or quantity produced/constructed over a specific time period. The application of realistic production rates is the key in setting an appropriate contract completion time. Production rates for the same item of work will vary considerably across the State, from small to large construction projects and from rural to urban areas. Production rate ranges should be established based on project size, type (grading, structures, etc.), and location (urban or rural) for controlling items of work.

B. Typical production rates follow this text.

IV. Factors Which Influence Contract Time

A. In addition to production rates, the following items should be considered when determining contract time:

1. Effects of maintenance of traffic requirements on scheduling and the sequence of operations.
2. Curing time and waiting periods between successive paving courses or between concrete placement operations, as well as specified embankment settlement periods.
3. Seasonal limitations for certain items needs to be considered when determining both the number of days the contractor will be able to work as well as production rates.,
4. Conflicting operations of adjacent projects, both public and private.
5. Review time for falsework plans, shop drawings, post-tensioning plans, mix designs, etc.
6. Time for fabrication of structural steel and other specialty items.

7. Time for fabrication/procurement of signal/illumination equipment.
 8. Coordination with utilities.
 9. Time to obtain permits.
 10. The effects of permit conditions and/or restrictions.
 11. Restrictions for nighttime and weekend operations.
 12. Time of the year of the letting as well as duration of the project.
 13. Special local area events (i.e. Parades, Festivals, Athletics, Fairs, and Races).
 14. Canadian and neighboring states holidays.
 15. Location.
 16. Work hour/noise restrictions.
 17. Other pertinent items as determined by the designer.
- B. Zero working days may be indicated during the winter months while 20 to 22 working days per month are common during the summer. Bridge work is generally assigned the greatest number of working days per month. If historical working day data is not available, historical rain and temperature data is available from the National Weather Service to develop average working days per month.

V. Adapting Production Rates to a Particular Project

- A. Before time durations for individual work items can be computed, certain project specific information should be determined and some management decisions made. A determination should be made relative to the urgency of the completion of the proposed project. The traffic volumes affected as well as the effect of detours should be analyzed. The size and location of the project should be reviewed as well as the effects of staging, working double shifts, the feasibility of night work as well as restrictions on closing lanes. Also, the availability of material for controlling items of work should be investigated. For example, it might be appropriate to consider the need for multiple crews on a specific item to expedite the completion when there are exceptionally large quantities or when there is a large impact on traffic.
- B. Procedures which would accelerate project completion should be considered when construction will affect traffic substantially or when project completion is crucial. This is especially important in urban areas which have high traffic volumes. Realizing that public inconvenience needs to be minimized, the production rates applied in setting the contract time for these types of projects should be based on that of an efficient contractor working more than 8 hours per day, more than 5 days per week, and possibly

with additional workers. The development and application of a separate set of production rates for these critical types of projects is recommended.

VI. Computation of Contract Time - Developing a Progress Schedule

- A. The contract time for most construction projects can be determined by developing a progress schedule. The progress schedule basically shows the production durations associated with the chosen production rates for the items of work. The time to complete each critical item (critical items are those items that are essential to the total project completion) of work included in the progress schedule is computed based on the production rates applicable to that project. Critical items should be arranged by chronological sequence of construction operations. Minor items that may be performed concurrently with critical items do not need to be analyzed.
- B. In determining a progress schedule it should be remembered that the start and ending time for each critical item needs to be based on the earliest time on which work on that item will begin and how long it will take to complete. The earliest start time for each activity will be determined by the completion of the activities which precede it, allowing for the fact that some activities can begin before the preceding activity is entirely completed. Along with the time established for all critical items, additional time should be allowed in the contract for initial mobilization.

VII. Critical Path Method

- A. The critical path method (CPM) must be used to determine the number of working days. The CPM used to determine working days for a project shall be transmitted to the Plans Branch with the PS&E transmittal.
- B. A brief description of the application of the CPM technique to determine contract time is indicated below:
 - 1. The first step in applying the CPM method is to break a project down into separate tasks or operations necessary for project completion. Each of these separate operations or processes is called an activity. The completion of an activity is called an event.
 - 2. Once all the activities necessary to complete a project have been listed, the relationship of these activities to one another needs to be determined. In some cases several activities can be undertaken concurrently while at other times certain activities cannot be undertaken until others have been completed. In general, in determining the sequence of operations, the question needs to be asked: "What needs to be done before proceeding with this activity as well as what can be done concurrently?" Every activity, therefore, has a definite event to mark its relationship with others with respect to completing a project.
 - 3. In working with this procedure, a network, which is a diagrammatic representation of the project to be undertaken, is developed. The network

shows the correct sequence and relationship to activities and events. Each separate activity is shown by its own arrow and the start of all activities leaving a node depends on the completion of all activities entering a node. Therefore, the event represented by any node is not achieved until all activities leading to the node have been completed. The resulting diagram will be schematic representation of a project, showing all the relevant activities and events in correct sequence.

4. An actual time can be set to each activity based on production rates and other appropriate factors. The time to complete each activity is shown on each arrow to indicate the duration. The "early start" for each activity is the earliest point in time that it will start, provided that all activities before it have finished. This is not necessarily the point in time that it will start; however, it is the earliest time that it can start. The "early finish" for an activity is merely the duration of the activity after its "early start". As is the case with the "early start", this is not necessarily the point in time that the work represented by the activity will be over, but is the earliest point in time that it can occur. A "finish" date in CPM is defined as the first day upon which no further work is to be done for an activity; it is the first day after the physical completion of the activity. The completion time of a project is, therefore, the sum of the longest time path through the network leading to completion of the project.
5. The optimum time and cost for performing the project can be evaluated by assigning resources (equipment, labor hours, and materials) to each activity. The diagrammatic representation of the project then provides a means to evaluate the costs incurred with respect to the completion of specified activities.

C. This brief summary gives an indication of how this method can be applied to each project. Several advantages of using such a schedule are:

1. It is an accurate technique for determining contract time and verifying that the project can be constructed as designed and with identified construction sequences:
2. It is a useful tool for project managers in monitoring a project, especially when dealing with relationships of work items with respect to time; and
3. Activities responsible for delays can be identified and corrective measures to keep a project on schedule can be determined.

D. Several drawbacks of CPM schedules are:

1. They need to be developed by someone knowledgeable in using CPM scheduling; and

2. They need to be updated regularly to assure that the contractor's operation is accurately represented.

E. Two classes, offered by the Department, for design scheduling are listed below:

- CB5** GEN: Intro to Scheduling
 - See ATMS for course description
- CIL** DES: Contract Working Days Requires CB5
 - See ATMS for course description

Courses may change so the designer should always check with their Region Trainer for latest courses offered.

VIII. Other Factors Which Influence Contract Time

- A. Construction time on some projects, such as illumination or signalization, may be governed by the long lead time necessary to obtain materials. To minimize traffic disruption, the contract may specify a completion date several months after the notice to proceed, but the contractor should be limited to a relatively short on-site time. This may be accomplished by including in the contract a "conditional notice to proceed" clause which would allow a specified amount of time to purchase and assemble materials followed by issuance of a full work order which would be issued upon expiration of the assembly period or sooner, upon the contractor's request.
- B. Another approach in which greater flexibility may be allowed would be to include in the contract a combination of an overall completion date and a specified number of consecutive available working days which would be charged once construction had started. It is sometimes advantageous to allow a contractor to set the actual construction dates within a given construction season. An example would be a typical small paving job that may only require the contractor to be on-site for a few weeks. For a project let in the spring, the completion date can be set for the end of the construction season, but the contractor's on-site time may be limited in the contract to a month. This allows the contractor to schedule this contract with consideration of other work the contractor may have in the same paving season. Net benefits include lower project inspection cost and a minimal disruption to traffic.
- C. An option which may be applicable to some projects is dividing a project into phases with each phase having its own completion date. This may be applicable when coordinating with other projects or activities in the area in order to meet tight deadlines.

IX. Production Rate Table

The following production rates should be used in computing contract completion time. Production rates vary depending on amount of traffic, complexity of project or other restrictions.

Rates have been produced based on data furnished by districts with disregard to size or complexity of project or quantity of a particular item.

Generally, large quantities in a particular project will have high production rates.

PREPARATION

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Mobilization	Days	3 to 15	3 to 15
Clearing and Grubbing	Ac.	1.5	3
Stripping	Ac.	1.5	3.5
Removing Manhole	Ea.	2.5	2.5
Removing Catch Basin	Ea.	4.5	4.5
Removing Conc. Inlet	Ea.	6	6
Removing Bituminous Pavement	S.Y.	1,800	3,000
Removing Cement Conc. Pavement	S.Y.	600	1,200
Removing Asphalt Conc. Pavement	S.Y.	1,100	2,700
Removing Cem. Conc. Curb & Gutter	L. F.	1,100	1,500
Removing Asph. Conc. Curb	L. F.	1,900	1,900
Removing Cem. Conc. Sidewalk	S.Y.	250	730
Removing Guardrail	L. F.	1000	1,200
Removing Guardrail Anchor	Ea.	6.5	6.5
Removing Paint Line	L. F.	1,900	1,600
Removing Plastic Line	L. F.	900	500
Removing Paint Marking	S.Y.	320	60
Removing Plastic Marking	S.Y.	120	50
Removing Raised Pav't Markers	Hund.	8.5	3.0
Removing Chain Link Fence	L. F.	500	800
Removing Wire Fence	L. F.	2,100	2,700

Preparation Items

1. Clearing and grubbing rates are very dependent on density and type of vegetation.
2. Some of these items may be included in roadway excavation work.
3. If removal items are to be salvaged the production rate may be less.
4. Proximity of waste site may be a factor.

GRADING

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Roadway Excavation			
Range	C.Y.	600-16,000	1,000-12,000
Average	C.Y.	2,000	7,000
Pavement Repair Excavation	C.Y.	70-300	70-300
Borrow Excavation			
Range	C.Y.	850-2,500	1,700-12,000
Average	C.Y.	1,200	6,800
Embankment Compaction			
Range	C.Y.	850-7,500	1,500-12,000
Average	C.Y.	1,700	6,800
Gravel Borrow			
Range	Ton	1,300-4,000	900-17,500
Average	Ton	1,600	11,300

Grading items

1. Pavement repair excavation usually requires backfill and pavement replacement the same day.
2. Consideration must be given as to whether trucks or scrapers will be used.
3. Embankment compaction is usually in conjunction with roadway excavation or gravel borrow.
4. Rock cuts would decrease roadway excavation production rates.
5. Proximity of pit and waste sites may be a factor.

STOCKPILING (Aggregate Production)

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Ballast	Ton	1,200-3,000	1,200-3,000
Gravel Base	Ton	1,200-3,000	1,200-3,000
Crushed Surf. Base Course	Ton	1,200-3,000	1,200-3,000
Crushed Surf. Top Course	Ton	1,200-2,700	1,200-2,700

Stockpiling Item

1. Aggregate production is dependent on the source. Time must be allowed for drilling and blasting to get ahead of crushing operation in a quarry site.

DRAINAGE

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Ditch Channel Excavation			
Range	C.Y.	125-1,450	270-4,500
Average	C.Y.	950	1,700
Concrete Inlet	Ea.	4.5	4.5
Cement Conc. Gutter	L.F.	250-400	250-400
Asphalt Conc. Gutter	L. F.	600-1,000	600-1,000
Hand Placed Rip Rap	C.Y.	30-50	30-50
Riprap			
Range	Ton	350-1,550	350-1,550
Average	Ton	720	720
Quarry Spalls			
Range	Ton	250-1,000	250-1,000
Average	Ton	750	750
End Section W/Bars	Ea.	2.5	2.5
Flared End Section	Ea.	7.5	7.5
Underdrain Pipe			
Range	L. F.	200-700	200-700
Average	L. F.	300	300
Drain Pipe			
Range	L. F.	350-1,300	350-1,300
Average	L. F.	400	400
Culvert Pipe 12"-36"			
Range	L. F.	50-650	50-650
Average	L. F.	170	170
Culvert Pipe 42"-72"	L. F.	20-120	20-120
Stru. Plate Pipe	L. F.	20	20
Stru. Plate Pipe Arch	L. F.	20	20
Steel Under Pass	L. F.	20	20

Drainage Items

1. End sections are usually incidental to pipe runs.
2. Pipe production rates can vary due to depth of structure excavation.

STORM SEWERS

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Catch Basin Type 1	Ea.	3.5	3.5
Catch Basin Type 2 48"-54"	Ea.	2	2
Catch Basin Type 2 72"-96"	Ea.	1.5	1.5
Catch Basin Type 3	Ea.	2	2
Testing Storm Sewer Pipe			
Range	L. F.	675-3,500	675-3,500
Average	L. F.	825	825
Storm Sewer Pipe 12"-36"			
Range	L. F.	100-600	100-600
Average	L. F.	225	225
Storm Sewer Pipe 42"-72"	L. F.	50-200	50-200

Storm Sewer Items

1. Pipe production rates can vary due to depth of structure excavation.
2. Testing production rates are dependent on pipe sizes (large diameter pipe require more time then small diameter pipe).

SANITARY SEWER

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Testing Sewer Pipe			
Range	L. F.	750-3,500	750-3,500
Average	L. F.	925	925
Sewer Pipe 6"-48"	L. F.	125-400	125-400

Sanitary Sewer Items

1. Pipe production rates can vary due to depth of trench excavation.
2. Conflicts with existing utilities can cause reduced production rates.
3. Testing production rates are dependent on pipe sizes (large diameter pipe require more time then small diameter pipe).

WATER LINES

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Installing Valves	Ea.	3	3
Hydrant Assembly	Ea.	2	2
Resetting Hydrant	Ea.	1.5	1.5
Service Connection	Ea.	3.5	3.5
Water Main			
Range	L. F.	150-1,000	150-1,000
Average	L. F.	325	325

Water Line Items

1. Water main production rates can vary due to depth of excavation.
2. Time must be allowed for cleaning and testing.
3. Conflicts with existing utilities can cause reduced production rates.

STRUCTURE

See Chapter 12 for CONSTRUCTION TIME RATES in the *BRIDGE DESIGN MANUAL*.

SURFACING

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Ballast	Ton	1,000-3,000	1,000-3,000
Gravel Base	Ton	1,000-3,000	1,000-3,000
Crushed Surf. Base Course	Ton	1,000-3,000	1,000-3,000
Crushed Surf. Top Course	Ton	550-2,300	500-2,300

Surfacing Items

1. Shoulder work can reduce production rates.
2. Irregular areas can reduce production rates.

BITUMINOUS SURFACE TREATMENT

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Processing and Finishing			
Range	Mile	1-2.5	1-2.5
Average	Mile	2	2
Class A - 12' Wide			
Range	Mile	1.5-7.5	1.5-7.5
Average	Miles	5.5	5.5
Classes B,C,D - 12' Wide			
Range	Mile	2.5-10.5	2.5-10.5
Average	Mile	8.5	8.5

ASPHALT TREATED BASE

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Asphalt Treated Base	Ton	1,500-2,800	1,500-2,800

CEMENT CONCRETE PAVEMENT

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Cement Conc. Pavement	S.Y.	15,500	15,500
Unfinished Conc. Pavement			
	Range	S.Y.	1,300-25,000
	1,300-25,000		
	Average	S.Y.	4,500
	4,500		
Cement Conc. Approach	S.Y.	50-200	50-200
Bridge Approach Slab	C.Y.	40	40

Cement Concrete Pavement Items

- Concrete paving rates are based on a single drum batch plant. Single drum batch plant produces 10 CY per minute, with 90% efficiency.
- Concrete paving "Rule of Thumb" 1 mile of 24 foot wide pavement per day (slip form).

3. Unfinished concrete pavement usually has irregular areas that require more forming and hand work.
4. Allow time for forming, if required, and curing.
5. Cement Conc. Approaches are usually incidental to sidewalk work.

ASPHALT CONCRETE PAVEMENT

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Preparation of Untreated Roadway	Mile	1-4	1-4
Planing Bituminous Pavement			
Range	S.Y.	1,500-32,500	5,700-18,000
Average	S.Y.	3,200	9,800
Prime Coat Treatment	S.Y.	14,600	14,600
Asphalt Conc. For Prelevel			
Range	Ton	500-1,500	800-2,300
Average	Ton	700	1,500
Asphalt Conc. For Pavement	Ton	1,200-2,200	1,300-3,000
Asphalt Conc. For Shoulder			
Range	Ton	450-1,000	800-2,000
Average	Ton	800	1,200

Asphalt Concrete Pavement Items

1. Time may be required for road approaches.
2. Night work will affect paving production.
3. Requirements to plane and pave back in the same day will affect project time.

IRRIGATION AND WATER DISTRIBUTION

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Vacuum Breaker Assembly	Ea.	4.5	4.5
Manual Control Valve W/Box	Ea.	4.5	4.5
Auto Control Valve W/Box	Ea.	3	3
Auto Elec. Controller 5 or 8 sta.	E a.	1.5	1.5
Auto Elec. Controller 10 or 12 sta.	Ea.	1	1
Sprayer	Ea.	35	35
Sprinkler	Ea.	36	36

Irrigation/Water Pipe	L. F.	700	700
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EROSION CONTROL AND PLANTING

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Seed Fert. and Mulching			
Range	Ac.	4-10	4-10
Average	Ac.	8	8
Preparation For Planting .			
Range	S. Y.	1,600-7,000	1,600-7,000
Average	S. Y.	2,700	2,700
Sod Installation	S. Y.	800-2,750	800-2,750
Seeded Lawn Installation			
Range	S. Y.	2,000-18,000	2,000-18,000
Average	S. Y.	2,400	2,400
Mulch/Sawdust	C. Y.	360	360

TRAFFIC

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Cement Conc. Curb	L. F.	500	2,200
Beam Guardrail			
Range	L. F.	450-1,850	450-1,850
Average	L. F.	750	750
Beam Guardrail Anchor	Ea.	5.5	5.5
Precast Conc. Barrier	L. F.	750-1,600	750-1,600
Cast-In-Place Barrier	L. F.	100-800	100-800
Temp. Conc. Barrier	L. F.	800-1,800	800-1,800
Resetting Conc. Barrier	L.F.	800-1,700	800-1,700
Guide Posts	Ea.	80-160	80-160
Paint Line	L. F.	14,000-100,000	60,000-211,000
Plastic Line	L.F.	400	2,200
Raised Pavement Marker	Hund.	8	18

Traffic Items

1. Allow time for forming and curing of concrete work.
2. Pavement marking production rates will decrease in channelization, intersection, and interchange areas.

SIGNAL/ILLUMINATION

Four pole signal intersection -	10-20 days
Illumination system -	5 days per pole
Would include the following work:	

Excavation, concrete, cure time, plumbing,
conduit and wiring.

Signal/Illumination Items

1. For material procurement use 4 months minimum.
2. These would be non-charged work days in most cases.
3. Revising/modifying existing system may warrant additional time.
4. Salvaging existing equipment may warrant additional time.
5. On projects where the electrical work is a small part of the overall work, it is doubtful that this work would be critical.

SIGNING

Sign Installation:

Sign Cantilever	2 days
Sign Bridge	5 days
Overhead Structure	2 days
Wood Posts	15/day
Metal Posts (concrete base)	4/day

Fabrication:

Signs	500 ft ² /day
Cantilever Structure	120 days
Sign Bridge Structure	120 days

Signing Items

1. Structure fabrication time includes approval of shop plans.
2. Fabrication of multiple structures would take less time.

OTHER ITEMS

Item	Units	Daily Production Rate (Based on 8 hour day)	
		West	East
Monument Case and Cover	Ea.	8	13
Conc. Slope Protection	S. Y.	100	100
Chain Link Fence	L. F.	250-700	250-700
Wire Fence			
Range	L. F.	550-3,600	550-3,600
Average	L. F.	1,600	1,600
Glare Screen			
Range	L. F.	100-1,000	300-1,900
Average	L. F.	350	1,100
Rock Protection Fence	L. F.	300	300
Gabion Cribbing			
Range	C.Y.	20-110	20-110
Average	C.Y.	40	40
Adjust Cone. Inlet	Ea.	4-11	4-11
Adj. Manhole	Ea.	8	8
Manhole Under 12 Ft.	Ea.	1.5	1.5
Manhole Over 12 Ft.	Ea.	1	1
Adjust Catch Basin	Ea.	4-12	4-12
Adjust Valve Box	Ea.	7-16	7-16

Other Items

1. Fencing production rates will vary with terrain, ground cover, and alignment.

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